Source Protection User's Guide for Ground-Water Sources

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UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
DRINKING WATER

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Introduction

Protecting wells and springs is critical because they are vulnerable to contamination. The first step in protecting a drinking water source is to develop and implement a Drinking Water Source Protection (DWSP) plan. This user's guide suggests important information that you should collect about your drinking water sources and will help you identify the potential contamination sources (PCSs) which may 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 (Division) does not have the authority to control the activities of PCSs.*** However, city, town, and county governments do. These local governments can work on your behalf to protect wells and springs from contamination by passing ordinances to control land uses within protection zones. Many have. To date, seventeen of twenty-nine counties in Utah have passed some sort of DWSP ordinance. See Appendix A for a list of counties which have adopted a DWSP ordinance. Most of these county ordinances can be used to meet certain requirements of the Drinking Water Source Protection Rule (R309-600, Utah Administrative Code (UAC)). 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 a source protection program in your community. A quality source of drinking water can be a source of community pride. Sources of drinking water are valuable assets and protecting them protects the capital the community has invested in them.

Source water protection focuses on risk prevention as the first step in a multi-barrier approach, used by the Safe Drinking Water Act, to protect drinking water supplies.

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.

Differences Between New Sources and Existing Sources

It's important to understand the differences between a new source and an existing source, and how the source protection rule applies to each. According to R309-600-6(1)(k), an "existing" ground-water source is a source for which plans and specifications were submitted on or before July 26, 1993 (the date the rule was implemented). According to R309-600-6(1)(r), a "new" source is a source for which plans and specifications were submitted after July 26, 1993. Because the Division only has the authority to regulate public water systems (PWSs), and specifically does not have authority to regulate land use, the Division's requirements can only apply to the regulation of PWSs.

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As you review this guide, and perhaps also the rule, you'll note that for "new" sources, pollution sources and potential contamination sources are restricted in zone 1, and sometimes also in zone 2. The Division can enforce these restrictions because we have the authority to approve the construction and siting (location) of a new well or a spring, and can require that the source not be located in proximity to sources of contamination. A location for the new source will have to be selected where those issues don't exist. However, the Division does not have the authority to limit such activities in protection zones for "existing" sources that were in place and planned before the date the rule was implemented. Therefore, for "existing" sources, the Division has no ability to restrict pollution sources or potential contamination sources as part of the Division's regulations (R309-600). Local authorities, such as county and city zoning, can and do regulate such activities, and such activities must be reviewed with those local authorities prior to implementation.

Division of Drinking Water Rule R309-600 specifies additional source protection requirements for "new" sources of ground-water.

Submittal Schedule for Proposed New Wells and Springs

A Preliminary Evaluation Report (PER) and construction specifications must be submitted to the Division for each new well, spring, and tunnel before its construction begins. This includes new sources for transient non-community water systems[1]. A new source is any source for which plans and specifications were submitted to the Division after July 26, 1993. A PWS shall not begin construction of a new source until the Division concurs with the PER and a plan approval to drill letter has been issued. A refined report that meets the requirements of a DWSP Plan must then be submitted to the Division within one year of when the approval letter is dated. Refer to Chapters 1 and 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 updated and 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 has been 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.

[1] 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, all new sources are required to meet the requirements of R309-600.

The following table identifies the deadlines for resubmitting these plans:

Table 1 – Schedule for DWSP Plan Submittals

Population Served by PWS	Source Type	Initial Due Date	Next Update Due Date
Over 10,000	Well	December 31, 2002	December 31, 2020
3,300 - 10,000	Well	December 31, 2003	December 31, 2021
Less than 3,300	Well	December 31, 2004	December 31, 2022
All Populations	Spring	December 31, 2005	December 31, 2023

We have prepared a *Standard Report Format for Ground-Water Source Protection Plan Updates* to assist PWSs in preparing their updated plans. We strongly advise that this format be followed to ensure that none of the important parts of these documents is left out. A copy of this document can be found in Appendix B.

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.

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 the Division must be stamped and signed by a licensed geologist or licensed engineer. Refer to Appendix D for a list of consulting professionals who have completed plans in the past. Appendix E provides additional guidance for consulting professionals to use while preparing plans.

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 know 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 checklists are also very important for summarizing many of the other sections of an effective DWSP Plan.

The management and implementation sections are extremely important. Know what they say because you will be responsible for implementing the strategies outlined in these sections of your plan.

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 refer to the Drinking Water Source Protection Rule (R309-600, UAC) located in Appendix F. The Division 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 Updates* to assist PWSs in preparing PERs, DWSP Plans, and DWSP Plan Updates. Copies of these standard report formats are available in Appendix B. We strongly advise that you follow these formats to ensure that all of the important parts of these documents are addressed.

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 by visiting nepis.epa.gov.

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 Rural Water Association staff at 801-756-5123.

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Part I

PRELIMINARY EVALUATION REPORTS FOR NEW GROUND-WATER SOURCES

Use this part of the guide to develop a Preliminary Evaluation Report (PER) for new wells, springs, and tunnels. Remember that this report must be reviewed and approved before you begin construction or *you may be charged an after-the-fact cost-recovery fee*. 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.

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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. Approval of the PER and Engineering Plans and Specifications, and a valid start card from the State Engineer, are required before the Division of Drinking Water will grant approval to begin construction of a new ground-water source of drinking water.

Replacement Wells

A PER is not required for proposed wells if the PWS receives written notification from the Division that the well is classified as a replacement well. The PWS must submit a letter or email 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).

Concurrence Requirement

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 from contamination *before* they are constructed. Because of this, PERs and construction specifications must be submitted to the Division, 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*. A copy of this document can be found in Appendix B. ***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 the 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 the Division and a permit from the Division of Water Rights (DWR) are required. ***It is very important to obtain both an approval from the Division of Drinking Water and a permit from DWR before the well is drilled.***

Constructing a new ground-water source of drinking water without prior Division approval may result in the assessment of fees and Improvement Priority System (IPS) points.

R309-600-13(1) states that 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 the Division. Additionally, engineering information in accordance with R309-515-6(5)(a) or R309-515-7(4) must be submitted to the Division. The Director will not grant plan approval until both source protection and engineering requirements are met.

Purpose of Preliminary Evaluation Reports

PERs and 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 its sources of drinking water now and in the future.*** They should be logical and the protection strategies should be easily understood and implementable.

Drinking Water Source Protection Plans

The PER must be refined to meet the requirements of a Drinking Water Source Protection 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 the source protection zones for new springs.

Protected and Unprotected Aquifers

The Rule classifies wells as being in *protected* or *unprotected* aquifers. *If there are insufficient data to demonstrate protected aquifer status, the well will be considered to be producing from an unprotected aquifer*. 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)[2]. New wells in unprotected aquifers are required to have land use agreements for zones one and two[2]. This is because unprotected aquifers are considered to be 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.

Land use agreements and local zoning ordinances are used to help protect the most vulnerable areas near a drinking water source from future contamination.

[2] Or the new ground-water source must be located in an area where zoning ordinances are in effect which accomplish the same level of protection that is required in a land use agreement.

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 with the understanding 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:

<u>Unprotected aquifer</u>

- 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 with 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.

<u>Protected aquifers</u>

- Zone one - all sewer lines and laterals shall be constructed in accordance with 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 section 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 - Land use agreements are required in zone one for all wells and springs. They are also required in zone two for wells classified as producing from an unprotected aquifer 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 the Division.

A copy of the land use agreement, which has been recorded in the county recorder's office, must be submitted to the Division and an approval letter must be issued before the PWS will be permitted to introduce the new source into its public system.

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 the Division before you begin construction on any new source. There are a few PWSs that have unapproved sources that they cannot use because the required land use agreements were never obtained.

Land use agreements are often one of the biggest stumbling blocks a PWS encounters when seeking approval to develop a new ground-water source of drinking water.

Three examples of land use agreements follow.

1. The first is for a well in a *protected* aquifer:

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 UAC, 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 UAC, 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.**

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 the Division to do this research.

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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 location of a source of drinking water. Although not an all-inclusive list, below are items that should be considered as you develop a new ground-water 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 geological 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 UAC). It will also report whether the well is in a protected or an unprotected aquifer.

Will you be able to demonstrate that the well is located in a protected aquifer?

- 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.
- Protected aquifer status is required in order for a system to be eligible 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 ground-water is required. 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?

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

Are there uncontrolled pollution sources within zone two?

- 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?

- Sewer lines may not be located within zones one and two or a management area unless the criteria identified below are met. If sewer lines are located or planned to be located within zones one and two or a management area, the PER must demonstrate that they comply with these criteria. Sewer lines that comply with these criteria may be assessed as adequately controlled potential contamination sources.

(a) Unprotected Aquifers -

(i) Zone one - all 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.

(ii) Zone two - all sewer lines and laterals within zone two or a management area shall be constructed in accordance with R309-515-6.

(b) Protected Aquifers - in zone one all sewer lines and laterals shall be constructed in accordance with R309-515-6, and shall be at least 10 feet from the wellhead or margin of the collection area.

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

- 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 the Division.

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?

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

☐ ***Engineering Plans and Specifications***

Engineering plans and specifications governing well drilling and the PER must be prepared and submitted to the Division. A letter or letters that cover 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 the Division, 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 Operating Permit that allows it 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 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

☐ A copy of the recorded *land use agreement* or documentation that a map of the zones has been provided to the municipality and/or county if a local zoning ordinance was used in lieu of land use agreements.

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Part II

DRINKING WATER SOURCE PROTECTION PLANS

Use this part of the 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 Wells and Springs,* which is located in Appendix B.

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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 R309-600 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. DWSP Plans are briefly described below; a detailed description is in the *Standard Report Format for Wells and Springs* which is attached in Appendix B.

Purpose of Drinking Water Source Protection Plans

DWSP Plans are one of the most important steps a PWS can take to protect its 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 its sources of drinking water now and in the future. They should be logical and easily understood.

Drinking Water Source Protection Plans are working documents which should be used by Public Water Systems as often as necessary to ensure protection of 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 and supporting data that are used to define them.

The Inventory of Potential Contamination Sources (refer to Chapter 5) - The inventory is a prioritized list of all of the PCSs located within the protection zones.

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 management program is developed to control each of the existing PCSs determined to be not adequately controlled.

The Management Program for Future Potential Contamination Sources (refer to Chapter 8) - The management program is developed 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 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.

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

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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 its 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: 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 source. Appendix E contains guidance for professionals to use while preparing the delineation report.

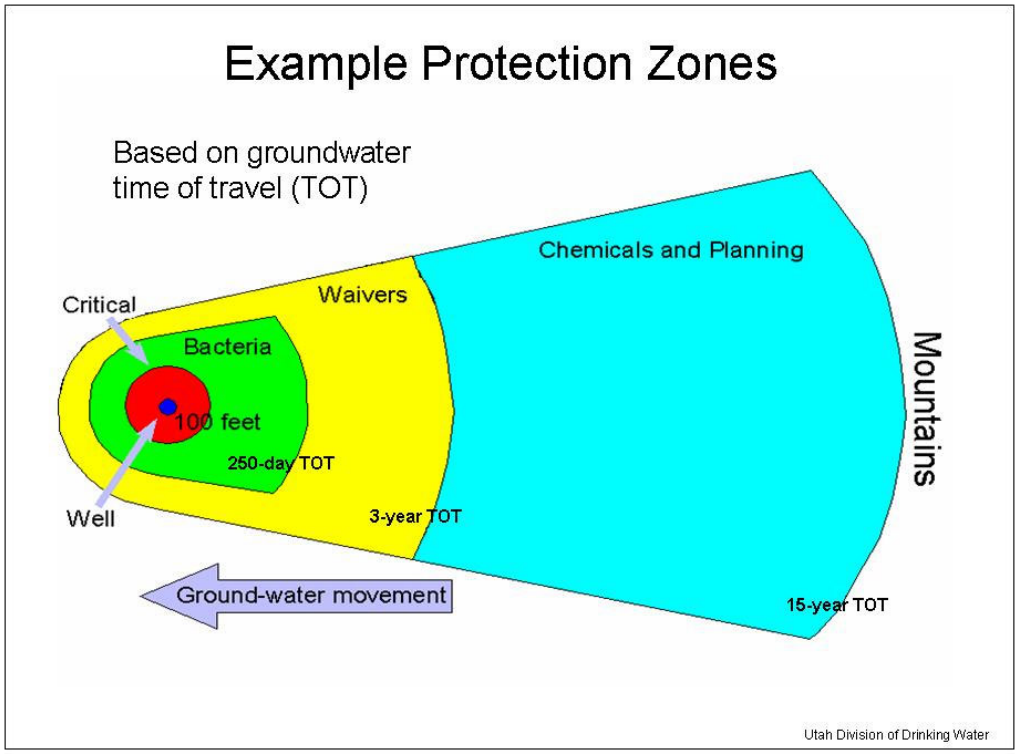
Geologic reports must be prepared, stamped, and signed by a licensed professional geologist or professional engineer.

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 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 ground-water. 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 Wells and Springs* and the *Standard Report Format for New Wells and Springs* in Appendix B 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 D contains a list of consultants that may be able to help you. This list is provided as a courtesy to PWSs. Caution should be exercised when selecting a consultant since not all licensed geologists and engineers are familiar with the DWSP program. 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.

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 the 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(6)(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.

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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 ground-water. 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 should be covered in a separate section (refer to 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 has prepared one (refer to Appendix G), 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. This is not meant to be an all-inclusive list. If you find other potentially contaminating activities that are not on this list, be sure to include them:

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
39. Roads, highways, and freeways
40. Salt and sand-salt piles
41. Sand and gravel mining operations
42. School vehicle maintenance barns
43. Sewer lines
44. Single-family septic tank/drain-field systems
45. Sites of reported spills
46. Small engine repair shops

47. Stormwater impoundment sites and snow dumps
48. Subdivisions using subsurface wastewater disposal systems (large and individual septic tank/drain-field systems)
49. Submersible pumps used to pump wells
50. Taxi cab maintenance garages
51. Tire shops
52. Toxic chemical and oil pipelines
53. Vehicle chemical supply storers and retailers
54. Vehicle dealerships
55. Vehicle quick lubes
56. Vehicle rental shops
57. Vehicle repair, body shops, and rust proofers
58. Vehicle service stations and terminals
59. Wood preservers

Databases

Databases, maintained by various agencies, may contain valuable information about PCSs located within your protection zones. Other sources of information include old and new telephone books, assessors' maps and records, city business licenses, and aerial photographs. Below is a list of databases that may be used to compile your list of PCSs. Other databases may be available. 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, such as a windshield survey, should be used to identify unpermitted facilities.

State of Utah Department of Environmental Quality (DEQ) Interactive Map Viewer

The Interactive Map Viewer contains data published by each of the five divisions within the DEQ: the Division of Drinking Water, Division of Air Quality (DAQ), Division of Environmental Response and Remediation (DERR), Division of Water Quality (DWQ), and the Division of Waste Management and Radiation Control (DWMRC). As of the date of this document, the map can be viewed at: https://enviro.deq.utah.gov. Data can be downloaded as Excel spreadsheets, csv files, and in ESRI shapefile or geodatabase formats.

The DEQ Interactive Map Viewer contains data from all five divisions within the Department of Environmental Quality and should be used as a reference when preparing the PCS inventory.

The Division of Drinking Water layers include public water system facilities, ground-water source protection zones, source water assessment zones (zones established for existing ground-water sources used by transient non-community systems), and surface water protection zones. The Division of Drinking Water layers are considered sensitive data. Therefore, a login is required to access these data.

The other four Divisions distribute layers to the public without the need for a login. Of particular interest are the layers maintained by DERR and DWMRC as the two agencies regulate and permit point sources of potential contamination such as underground storage tanks, leaking underground storage tanks, CERCLA

sites, solid waste facilities, etc. A PCS inventory would not be complete without performing a search of this database.

State Geographic Information Database (SGID)

The Utah Automated Geographic Reference Center (AGRC) maintains this database. Established by state law in 1991, Utah's SGID ensures that GIS map layers are developed in a coordinated fashion and shared openly. The SGID provides a one-stop access point to hundreds of data layers that were developed, aggregated, or acquired by state government (including the DEQ). It contains the locations of abandoned mines, CERCLA sites, RCRA sites, SARA Title III sites, underground storage tanks, class V injection wells, coal deposit sites, ground-water permit sites, toxic release inventory sites, etc. There may be a fee to obtain this information. AGRC is located at 1 State Office Building, Room 5130, Salt Lake City, Utah and can be contacted via phone at (801) 538-3665. Access to its data, as of the date of this document, can be initiated at opendata.gis.utah.gov.

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. Refer to the following website to locate your Local Emergency Planning Committee: https://dem.utah.gov/local-emergency-planning-committees-lepc/.

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.

The Division of Water Rights

The Utah Division of Water Rights (DWRi) maintains information about water rights and 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 DWRi also maintains an interactive map which can be accessed at https://maps.waterrights.utah.gov/EsriMap/map.asp.

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.

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 usually cannot be considered **adequately controlled** and are often difficult to locate and inventory:

- Petroleum and other toxic chemicals stored underground for certain uses or below certain threshold quantities.
- Petroleum and other toxic chemicals 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[3].
- 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.

[3] Source: Septic Systems and Ground-water Protection, An Executive's Guide, United States. Environmental Protection Agency. Office of Ground-Water Protection, 1986

- Under certain geologic conditions, some pesticides applied to the land can leach to ground-water even from normal application procedures.
- Pesticides may enter ground-water 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 ground-water 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 ground-water 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 at 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 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 Ground-water Contamination Sources in Wellhead Protection Areas** - A Priority Setting Approach, (EPA 570/9-91-023) or some other priority setting guideline may be used to establish an order if, in your judgment, there are circumstances that require a more precise order.

Identify and Plot Locations of PCSs

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. This also applies each time the DWSP plan is updated. If new PCSs are added to the inventory, they must be plotted on a 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.

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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 as *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. The instructions for assessing each type of control must be followed exactly or the assessment will be considered to be incomplete. Refer to Appendix H, 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.*

The assessment should focus on controls that are currently in place for a specific hazard. The assessment must not list items that will be completed by the PWS or the PCS in the future. If controls cannot be identified for a specific hazard, the PCS should be assessed as not adequately controlled and any proposed strategies should be included in the management program for existing potential contamination sources (next section of the DWSP plan).

Protected aquifer classification cannot be used to assess a 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 the PCS 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 or secondary containment that are in place to prevent a hazard from entering the ground-water. 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 negligible quantity control:

If you cannot identify the quantity of the hazardous substance being used, disposed, stored, or transported at a particular site, then you cannot claim that it is negligible.

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.

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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 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. The Division has generated general BMPs for the following facilities: dry cleaners, household hazardous waste, metal finishers, print shops, pollution prevention, septic tank/drain-field systems, vehicle maintenance, and use of pesticides and fertilizers. These fact sheets can be found in Appendix I.

The next step would be to encourage PCSs to develop their own facility-specific BMPs. Each PCSs goal should be to prevent hazardous chemicals from coming into contact with the ground. Additionally, you may use the fact sheet in Appendix I, which explains pollution prevention programs. Pollution prevention programs are very similar to BMPs, and are another common sense approach in preventing ground-water 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. These fact sheets are listed in Appendix I.

Information Sheets

Appendix I contains the PCS information sheets that are available from the Division. Refer to this material for guidance in identifying current controls and assessing them. It also contains suggestions about best management and pollution prevention practices. The Division has prepared a survey form (see Appendix G) that can be used to help you record and organize the information you gather about each PCS.

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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 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 control their contamination should not be allowed.

Minimum Requirement for Controlling Future PCSs

The PWS must establish and write into its 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

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.

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Authority and Jurisdiction

Many PWSs lack the authority or jurisdiction to pass and enforce zoning ordinances within their protection zones.

The Rule requires that land management strategies are 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. 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 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. 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 (population greater than 100,000) 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.

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Chapter 9 – The Implementation Schedule, Resource Evaluation and Recordkeeping Sections

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

Implementation Schedule

Implementing the land management strategies identified in your plan is critical to the success of your source protection program.

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 PCS hazard determined to be *not adequately controlled* must be addressed. The Rule requires that land management strategies be implemented according to this schedule.

According to the DWSP Rule, PWSs shall begin implementing their DWSP Plans in accordance with the implementation schedule within 180 days after submittal, if the plan is not disapproved, which should include documentation of how the land management strategies identified for existing and future potential contamination sources were implemented. If adequate documentation is not provided that the plan was implemented according to this requirement, the plan will be disapproved and Improvement Priority System (IPS) points will be applied. ***As of January 1, 2020, lack of plan implementation is considered a significant deficiency under the IPS rule (Rule R309-400).***

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.

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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 the Division 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 its 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 the Division 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 its rationing plan. An "action level" is the critical point of water shortage that signals a PWS to implement its 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 managers 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 its 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 the Division with the Contingency Plan.

2. 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.

3. 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.

4. 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.

5. 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.

6. Inventory all PCSs within each approximate protection zone that may affect the quality of the drinking water now or in the future.

7. Identify the microbiological, chemical, and radiological quality of each potential drinking water source. Ensure that all parameters are below established maximum contaminant levels (MCLs).

8. Estimate when each new drinking water source will need to be introduced into the system to meet projected supply requirements.

9. Determine the financial resources that may be required for each drinking water source development project. List possible sources of revenue.

10. List the positions and administrative duties of each person responsible for implementing the drinking water source development plan.

11. Submit a Preliminary Evaluation Report to the Division concurrently with engineering plans and specifications before construction begins on any new ground-water source of drinking water.

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Chapter 11 – Public Notification

A public that is informed about source protection issues can be 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.

Public notifications must address the following three criteria:

1. Notify consumers that the PWS's complete Drinking Water Source Protection Plans are available for their review.
2. 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.
3. 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, provide a copy of the Public Notification Statement to the Division and indicate how it was distributed to your consumers.

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Chapter 12 – Pesticide and Volatile Organic Chemical 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 $1,100 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. Reliably and consistently waivers do not need to be renewed and are not requested through the source protection program. The criteria for use and susceptibility waivers follows and is summarized in the table at the end of this chapter.

Use and susceptibility monitoring reduction waivers for VOCs and pesticides must be addressed in DWSP plan updates or they will expire.

If a source's DWSP Plan was due according to the schedule in R309-600-3, and was not submitted to the Division, its use and susceptibility waivers for the VOC and pesticide parameter groups will have expired. 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 and pesticide parameter groups will expire upon review of an updated 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 has been used, disposed, stored, transported, or manufactured within the past five years within zones one, two, and three.

A use waiver application form can be found in Appendix J.

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.

A susceptibility waiver application form can be found in Appendix K.

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 the Division 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 the Division.

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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 R309-200 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 and consistently waivers for VOCs and pesticides are summarized in the table below.

VOC and Pesticide Summary Table

	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 and Consistently	Annual	1/3 years	Three 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

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Appendices

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Appendix A – County Source Protection Ordinances

County	County Class	Ordinance/ Code No.	Year Enacted/ Adopted	Scope	Administration	Allowed in Lieu of LUA[4]
Beaver	5					No
Box Elder	3	216	1998	Allowed Uses: each use established prior to the effective date of the ordinance. Prohibited Uses: all pollution sources in zone 1, select PCSs[5] in zones 2 – 4.	Box Elder County Building Permit & Surveyor's Office	Yes
Cache	3	17.10.050	2016	Prohibited Uses: septic systems within zones 1 or 2.	Bear River Health Department	No
Carbon	4					No
Daggett	6					No
Davis	2	15.22.110	2008	Allowed Uses: any uses currently permitted so long as uses conform to rules & regulations of the regulatory agencies. Prohibited Uses: PCSs in zone 1, pollution sources within zone 2 unless controlled through design standards, PCSs in zone 3-4 unless controlled through land management strategies.		Yes
Duchesne	4	09-273	2009	Allowed Uses: Any uses currently permitted so long as uses conform to the rules & regulations of the regulatory agencies & uses established before effective date of ordinance. Prohibited Uses: uncontrolled PCSs or pollution sources in zone 1 (all aquifer types); pollution sources in zone 2 (unprotected aquifers) unless controlled with design standards.	Duchesne County	Yes

4 Land Use Agreement

5 Potential Contamination Sources

County	County Class	Ordinance/ Code No.	Year Enacted/ Adopted	Scope	Administration	Allowed in Lieu of LUA[6]
Emery	5	6-19	2009	Allowed Uses: any use permitted within the M-1 (Mountain) zone so long as uses conform to rules, any open land use where building is incidental. Prohibited Uses: PCSs in zone 1 unless controlled with design standards, pollution sources in zone 2 unless controlled with design standards, PCSs in zones 3 & 4 unless controlled through land management strategies.	Emery	Yes
Garfield	5					No
Grand	5	Article 4.5	Amended April 2008	Allowed Uses: conditional uses allowed under 9.11 Prohibited Uses: pollution sources in recharge areas designated according to the U.S. EPA Sole Source Aquifer recharge area.	Grand County	No
Iron	3	Chapter 13.16.010	2007	Allowed Uses: each use established before the effective date, existing uses which conform to rules and regulations, and open land uses incidental to primary. Prohibited Uses: PCSs in zone 1 unless controlled with design standards, pollution sources in zone 2 unless controlled with design standards, PCSs in zones 3 & 4 unless controlled through land management strategies. ***Not enforced for areas associated with the "optional two-mile radius" delineation procedure.***	Owner & PWS[7] Iron County's officers can enforce	Yes
Juab	4					No
Kane	5	9-26-1	1996 Amended 2013	Allowed Uses: uses or conditions in place prior to Sept. 1996 Prohibited Uses: PCSs in zone 1 unless controlled with design standards, pollution sources in zone 2 unless controlled with design standards.	Kane County Planning Office	Yes

[6] Land Use Agreement

[7] Public Water System

County	County Class	Ordinance/ Code No.	Year Enacted/ Adopted	Scope	Administration	Allowed in Lieu of LUA[8]
Millard	4	01-04-09 (5-5-1)	2001	Allowed Uses: any uses currently permitted so long as uses conform to rules & regulations of the regulatory agencies and other open land use where building is incidental. Prohibited Uses: Pollution sources in zone 1, pollution sources within zone 2 unless controlled through design standards, PCSs in zone 3-4 unless controlled through land management strategies.	Millard County Commission	Yes
Morgan	4					No
Piute	6					No
Rich	6	3037	2018	Allowed Uses: each use established before the effective date, existing uses which conform to rules and regulations, and open land uses incidental to primary. Prohibited Uses: Uncontrolled PCSs or pollution sources in zone 1 (all aquifer types), pollution sources in zone 2 (unprotected aquifers) unless controlled with design standards, PCSs in zones 3 & 4 unless controlled through design or land management strategies.	Rich County Planning and Zoning	Yes
Salt Lake	1	Chapter 9.25	2010	Allowed Uses: Each use established before the effective date of this section & uses incidental and accessory to such use may be continued in the same manner thereafter, provided that such use is not in violation of any other ordinance nor determined to be a nuisance. Prohibited Uses: matrix of PCSs prohibited and restricted is available as an appendix.	Salt Lake County Health Department	Yes
San Juan	4					No
Sanpete	4					No
Sevier	4					No

[8] Land Use Agreement

County	County Class	Ordinance/ Code No.	Year Enacted/ Adopted	Scope	Administration	Allowed in Lieu of LUA[8]
Summit	3	Chapter 5.3	2020	Allowed Uses: Not addressed. Prohibited Uses: Zone 1- pollution sources, PCSs, sewer lines closer than 50 feet to sources in unprotected aquifers and closer than 10 feet to sources in protected aquifers; zone 2 – pollution sources unless aquifer is protected or design standards are implemented, and all sewer lines not constructed in accordance with R309-515-6; zones 3 and 4 – surface use, storage, or dumping of hazardous waste or materials, sanitary landfills, or hazardous waste or material disposal sites (unless written approval is received by the Health Department from the PWS).	Health Department	Yes
Tooele	3	Chapter 25	2001	Allowed Uses: Appurtenant structures to the well or spring in zone 1. Single-family residential allowed in zone 2 if aquifer is "protected". Prohibited Uses: Septic in zone 2 of an "unprotected" aquifer, all other uses must be connected to sewer. Proposed use must demonstrate best management practices. Conditional uses established in zones 3 and 4.	Tooele County Department of Engineering	Yes
Uintah	3					No
Utah	2	Chapter 10-8	2010 Amended 2019	Allowed Uses: any use legally established before effective date of chapter, and uses incidental, provided that such use is not determined to be a nuisance. Prohibited Uses: PCSs and pollution sources in zone 1, pollution sources & PCSs within zone 2*, pollution sources and PCSs in zone 3-4*. *Wastewater systems may be allowed provided they meet the requirements of Section H.2*	Utah County	Yes
Wasatch	4	Section 16.28.06	2012	Allowed Uses: not addressed Prohibited Uses: pollution sources or PCSs in zone 1, and no PCSs in zone 2 unless design standards are implemented.	Wasatch County	Yes

County	County Class	Ordinance/ Code No.	Year Enacted/ Adopted	Scope	Administration	Allowed in Lieu of LUA[8]
Washington	2	2004-844-0 Chapter 23	2004	Allowed Uses: not addressed Prohibited Uses: PCSs in zone 1 unless controlled through design standards, and pollution sources within zone 2 unless controlled through design standards.	Washington County Planning Office	Yes
Wayne	6					No
Weber	2	Chapter 41-1		Allowed Uses: each use established before the effective date of the ordinance, uses incidental, so long as not a nuisance. Residential uses allowed in zone 2 as long as they are connected to a sanitary sewer system. Certain uses prohibited in zones 2 – 4 may be allowed if design standards are implemented. Prohibited Uses: all pollution sources and PCSs in zone 1, select PCSs in zones 2 – 4.	Weber County Building Division, Weber County Health Department, Surveyor's Office	Yes

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Appendix B – Standard Report Formats

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Preliminary Evaluation Report - Standard Report Format

For New Wells and Springs

If the Standard Reporting Format identified in this document is used, the Division of Drinking Water (Division) should be able to provide a timely review and response. If it is not followed, the writer must ensure that each item is adequately addressed. To ensure that the report is complete, please number each section of the Preliminary Evaluation Report to match the sections of the Standard Report Format.

A Preliminary Evaluation Report (PER) is required for all new wells, springs, and tunnels, which are used as sources of drinking water by a PWS. The PER and the Engineering Plans and Specifications should be submitted concurrently allowing for concurrent review. ***All geologic work submitted to the Division must be stamped and signed by a licensed geologist or licensed engineer.***

A PER cannot be approved if there are:

- Uncontrolled potential contamination sources (PCSs) or pollution sources within zone one of wells in *protected aquifers*.
- Uncontrolled potential contamination or pollution sources within zone one and uncontrolled pollution sources within zone two of wells and springs in *unprotected aquifers*.
- No land use agreement or zoning ordinance in place to restrict the future location of uncontrolled potential contamination or pollution sources within zone one of wells in *protected aquifers*.
- No land use agreements or zoning ordinances in place to restrict the future location of uncontrolled potential contamination or pollution sources within zone one and uncontrolled pollution sources within zone two of wells and springs in *unprotected aquifers*.

Replacement Wells

A PER is not required for proposed replacement wells. However, PWSs must submit a letter requesting that a well be classified as a replacement well and include documentation to show that the conditions required in R309-600-6(1)(y) are met. If a proposed well is classified as a replacement well, the PWS is still required to submit and obtain written approval for all other information as required in: (a) DWSP Plan for New Sources of Drinking Water (refer to R309-600-13(6), and (b) the Outline of Well Approval Process (refer to R309-515-6(5)).

Note: A Preliminary Evaluation Report must be submitted and approved before a well is drilled and before the Drinking Water Source Protection Plan is developed. Drinking Water Source Protection Plans are required within one year after the Preliminary Evaluation Report is approved. Please refer to the *Standard Report Format for Drinking Water Source Protection Plans for Wells and Springs* for specific instructions on developing a DWSP Plan.

EXECUTIVE SUMMARY

Include a brief summary of this report.

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1.0 INTRODUCTION

1.1 System Information:

Include the water system name, number, and address. Is it a new or an existing water system? Is it a public or a non-public water system? If public, is it a community, a non-transient/non-community, or a transient/non-community water system? The first name of a new water system submitted to the Division will be the name under which it will be tracked in the future. Please ensure, to the best of your ability, that the name established for the water system remains the same. A water system number will be assigned to that name.

1.2 Source Information:

Include the source name. Is it a proposed new source? Is it a well, spring, or tunnel? Is it an individual source, a well field, or a spring field? Is this source already constructed? Include a brief description of the source location. Have the plans and specifications been submitted to the Division?

1.3 Designated Person - R309-600-5:

Include the name, address, and phone number of the designated person. This information must be included in each PER that is submitted to the Division. Correspondence regarding this report and future correspondence will be directed to the designated person.

2.0 DELINEATION REPORT - R309-600-9(5)

Include the following information and a list of all sources or references for the information:

2.1 Geologic Data - R309-600-9(5)(a)(i):

Include a brief description of geologic features and aquifer characteristics observed in the well and area of the potential protection zones. This should include the formal or informal stratigraphic name(s), lithology of the aquifer(s) and confining unit(s), and description of fractures and solution cavities (size, abundance, spacing, orientation) and faults (brief description of location in or near the well, and orientation). Lithologic descriptions can be obtained from surface hand samples or well cuttings; core samples and laboratory analyses are not necessary. Fractures, solution cavities, and faults may be described from surface outcrops or drill logs.

2.2 Well or Spring Construction Data - R309-600-9(5)(a)(ii) & (iii):

If the source is a well, include the following information: Well driller's log of the well or logs of wells in the area that are representative of the planned well, if they are available, anticipated elevation of the well head, planned borehole and casing radius, projected total depth of the well and depth and length of the screened or perforated interval(s), well screen or perforation type to be used, method of well construction, type of pump to be used, expected location of the pump within the well, and the maximum projected pumping rate of the well. Averaged pumping rate values shall not be used. If the well has already been constructed please provide all the specific data required by the rules as if the well were an existing source.

If the source is a spring or tunnel, include the following information: A description or diagram of the collection area and method of ground-water collection.

2.3 Aquifer Data - R309-600-9(5)(a)(iv):

The aquifer properties that are needed to determine protection areas include:

Hydraulic conductivity, transmissivity, hydraulic gradient, direction of ground-water flow, estimated effective porosity, and saturated thickness of the producing aquifer(s). Estimated effective porosity must be between 1% and 30%. Clay layers shall not be included in calculations of aquifer thickness or estimated effective porosity.

The best way of determining aquifer properties is from a constant-rate aquifer test as described in R309-515-6(10)(b). However, this is not normally available for new wells. Therefore, if this test information is not available from the new well or a nearby well, in the same aquifer, then the aquifer properties will have to be estimated. Estimates can be derived using specific capacity information for nearby wells (found in well logs) or from published information. There are many sources of published information on aquifers throughout the State. The U.S. Geological Survey, whose reports are published by the Utah Department of Natural Resources, as well as the U.S. Geological Survey, has studied most areas. The method of determining the aquifer properties should be described. If the properties are estimated the method and underlying logic for determining the estimates must be described. All sources of information used in determining aquifer properties should be properly cited.

2.4 Hydrogeologic Methods and Calculations - R309-600-9(5)(a)(vii):

Include the hydrogeologic method used to delineate the protection zones, all applicable equations, values, and the calculations which determine the delineated boundaries of zones two, three, and four. If a computer model was used, include a description of the model and the parameters input into the model, as well as any assumptions behind the model or input values. Include any printouts of the data or graphical presentations from the computer program. Raw data and other output from the computer program may be included in an appendix. The hydrogeologic method or ground-water model must be reasonably applicable for the aquifer setting. For wells, the hydrogeologic method or ground water model must include the effects of drawdown (increased hydraulic gradient near the well) and interference from other wells.

2.5 Map Showing Boundaries of the DWSP Zones - R309-600-9(5)(a)(viii):

a. A map showing the location of the ground-water source of drinking water and the boundary for each DWSP zone. The base map shall 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 on the map, the complete boundaries for zones two, three, and four must be drawn and labeled. More detailed maps are optional and may be submitted in addition to the map required above.

b. Include a written description of the distances that define the delineated boundaries of zones two, three, and four. These written descriptions must include the maximum

distances up gradient from the well, the maximum distances down gradient from the well, and the maximum widths of each protection zone.

2.6 Protected or Unprotected Aquifer Classification - R309-600-9(3) & (6):

If the source is a well, indicate whether it meets the following criteria: 1) A naturally protective layer of clay, at least 30 feet in thickness, is present above the aquifer; 2) data to indicate the lateral continuity of the clay layer extends throughout zone two; and 3) the well is constructed 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 (R309-600-9(6). If these criteria are met, the aquifer may be considered protected.

If the PWS is seeking protected aquifer status for the well, and the well meets the criteria explained above, the licensed geologist or licensed engineer must state that the aquifer meets the definition of a protected aquifer based on the following information which must be included in the report: 1) Thickness, depth, and lithology of the protective clay layer; 2) data to indicate the lateral continuity of the protective clay layer over the extent of zone two. This may include such data as correlation of beds in multiple wells, published hydrogeologic studies, stratigraphic studies, potentiometric surface studies, and so forth; and 3) evidence that the well has been grouted or otherwise sealed from the ground surface to a depth of at least 100 feet and for a thickness of at least 30 feet through the protective clay layer in accordance with R309-515-9(6). Include construction methods.

Susceptibility waivers are another important reason for determining whether a source is located in a protected aquifer. Protected aquifer status is the most important criterion that is considered when PWSs applications for a source's susceptibility waivers for the pesticide and VOC parameter groups are reviewed. If this section is not addressed or the case for protected aquifer status is not properly justified then the aquifer will be classified as unprotected.

3.0 INVENTORY OF POTENTIAL CONTAMINATION SOURCES - R309-600-10

The following information about potential contamination sources (PCSs) may be organized in any manner that formats the data into an arrangement that is easy to understand and reference (information sheets, tables, etc.). Ensure that each section (3.1 through 3.5) is addressed.

3.1 List Potential Contamination Sources - R309-600-10(1):

Use the list in Chapter 5 of this guide and any other appropriate guidance to compile a list of PCSs that are within the four protection zones or the entire management area. The name and address of each commercial and industrial potential contamination source is required. Additional information should include the name and phone number of a contact person. Residential PCSs should be identified individually with addresses or in groups depending on the method the PWS intends to use to contact them for educational purposes.

3.2 Identify Hazards:

List the chemical, biological, and/or radiological substances used, stored, manufactured, transported, and disposed at each PCS. If there are no hazards associated with the PCS, it may not, in fact, be a PCS. Refer to Chapter 5 of this guide for the definition of a potential contamination source.

3.3 Prioritize the Inventory - R309-600-10(1)

Arrange the list of PCSs that are located within the four protection zones or the entire management area into a greatest to least risk priority order and state the basis for the order.

3.4 Potential Contamination Source Location - R309-600-10(1)

Include a description which identifies each PCS as to its location in zone one, two, three, four or in a management area.

3.5 Potential Contamination Sources Plotted on Map - R309-600-10(1)

PCSs must be plotted on the map required in Section 2.5a of this document.

Sewers Within DWSP Zones and Management Areas

Sewer lines may not be located within zones one and two or a management area unless the criteria identified below are met. If sewer lines are located or planned to be located within zones one and two or a management area, the PER must demonstrate that they comply with these criteria. Sewer lines that comply with these criteria may be assessed as adequately controlled potential contamination sources.

(a) Unprotected Aquifers -

(i) 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.

(ii) Zone two - all sewer lines and laterals within zone two or a management area shall be constructed in accordance with R309-515-6.

(b) 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.

Exceptions to this requirement may be considered if there is an adequate sewer line leak detection program.

4.0 IDENTIFICATION AND ASSESSMENT OF CURRENT CONTROLS – R309-600-10(2)

A PER cannot be approved if there are:

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

This section is to assess the hazard controls that are already in place to control a PCS. The assessment steps for each type of control are explained below. There are four types of hazard controls: Regulatory, best management/pollution prevention, physical, and negligible quantity controls. Reassessment dates

are not required in the Preliminary Evaluation Report; however, they will be required when the PER is updated to a Drinking Water Source Protection plan.

Any hazard that is not assessed as adequately controlled will be considered to be not adequately controlled. Additionally, if the hazards at a PCS cannot be identified, the potential contamination source must be assessed as not adequately controlled. Many PCS hazards have no controls and must be assessed as not adequately controlled. It is usually redundant to identify more than one hazard control; therefore, only one 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 G for a list of government agencies and the programs they administer to control PCSs.

Identify and Assess Regulatory Controls - R309-600-10(2)(a):

Regulatory controls are the codes, ordinances, rules, and regulations that are in effect to control a PCS hazard. The following five 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 which 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; and 5) assess the hazard as adequately controlled and indicate that no further land management strategies will be planned and implemented unless conditions change.

Identify and Assess Best Management and Pollution Prevention Practices – R309-600-10(2)(b):

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 four steps are required to assess a hazard as adequately controlled by best management and pollution prevention practices: 1) List the specific best management and pollution prevention practices which are being used to control this hazard; 2) indicate that PCS management is willing to continue the use of these practices to prevent ground-water contamination; 3) explain how these best management and pollution prevention practices will prevent ground-water contamination; and 4) assess the hazard as adequately controlled and indicate that no further land management strategies will be planned and implemented unless conditions change.

Identify and Assess Physical Controls – R309-600-10(2)(c):

Physical controls are man-made structures and impoundments, such as spill protection structures, that are in place to stop a hazard from entering the ground water. The following three steps are required to assess a hazard as adequately controlled by a physical control: 1) Describe the physical control(s) which have been constructed to control this hazard; 2) explain how these controls prevent contamination; and 3) assess the hazard as adequately controlled and indicate that no further land management strategies will be planned and implemented unless conditions change.

Identify and Assess Negligible Quantity Controls – R309-600-10(2)(d):

Negligible quantity controls refer to the amount or the relative non-toxicity of a hazardous substance that is used at a PCS facility. It means that quantity or toxicity is so low that the risk of ground-water contamination is negligible and not worth the time and effort to plan land management strategies to

control it. The following three steps are required to assess a hazard as adequately controlled by a negligible quantity 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; and 3) assess the hazard as adequately controlled and indicate that no further land management strategies will be planned and implemented unless conditions change.

5.0 LAND OWNERSHIP MAP AND LIST - R309-600-13(2)(c):

A land ownership map that includes all land within zones one and two or the entire management area. 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 in which they own land. A land ownership map and list are not required if ordinances are used to protect these areas.

6.0 LAND USE AGREEMENTS, LETTERS OF INTENT, OR ZONING ORDINANCES - R309-600-13(2)(d):

A PER cannot be approved if there is:

- No land use agreement or zoning ordinance to restrict the future location of uncontrolled potential contamination or pollution sources within zone one of wells in protected aquifers.
- No land use agreements or zoning ordinances to restrict the future location of uncontrolled potential contamination or pollutions sources within zone one and uncontrolled pollution sources within zone two of wells and springs in unprotected aquifers.

Land use agreements are required in zone one for new 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 the Division (R309-600-13(6)(1)(n)).

Land use agreements on publicly owned lands need not be recorded in the county recorder's office. However, a written statement from the administrator is required. This statement must meet the criteria identified for land use agreement requirements described above.

A letter of intent to record a land use agreement, which has been notarized, may be used when initially submitting a PER. This letter must include the language required in a land use agreement and a statement that, the owner(s) will record a land use agreement with 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 with the county recorder’s 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 system.

Zoning ordinances may be used in place of land use agreements if they contain the same restrictions as land use agreements do. In other words, uncontrolled PCSs must be restricted from zone one for wells in

protected and unprotected aquifers. Uncontrolled pollution sources 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.

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UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
DRINKING WATER

Drinking Water Source Protection Plan – Standard Report Format

For Wells and Springs

If the Standard Report Format identified in this document is followed, the Division of Drinking Water (the Division) should be able to provide a timely review and response. If it is not followed, the writer must ensure that each item is adequately addressed. Letters of response will always reference sections of this document. ***To ensure that each plan is complete, please number each section of the DWSP Plan to match the sections of the Standard Report Format.***

Purpose of Drinking Water Source Protection Plans

Drinking Water Source Protection (DWSP) plans are the primary means for public water systems (PWS) 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 must 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 will be carried out by the PWS.

The DWSP Rule applies to all ground-water sources of drinking water, which are used by PWSs to supply their systems. However, compliance with this rule is voluntary for existing ground-water sources of drinking water, which are used by public (transient) non-community water systems. PWSs are required to update their DWSP Plans as often as necessary to ensure they show current conditions in the DWSP zones and management areas. DWSP Plans are initially due according to the schedule in R309-600-3. Thereafter, updated DWSP Plans are due every six years from their original due date. This applies even though a PWS may have been granted an extension beyond the original due date.

All geologic work submitted to DDW must be stamped and signed by a licensed geologist or licensed engineer.

Note: Drinking Water Source Protection (DWSP) Plans may be developed for existing sources and for new sources that have approved Preliminary Evaluation Reports. If this plan is for a proposed new well or spring, you must prepare and submit a Preliminary Evaluation Report before you develop a Drinking Water Source Protection Plan for it. Please refer to the *Standard Report Format for New Wells and Springs* for specific instructions.

EXECUTIVE SUMMARY

Include a brief summary of this report.

1.0 INTRODUCTION

1.1 System Information:

Include the water system name, number, and address. Is it a new or an existing water system? Is it a public or a non-public water system? If public, is it a community, a non-transient/non-community, or a transient/non-community water system? The first name of a new water system submitted to DDW will be

the name under which it will be tracked in the future. Please ensure, to the best of your ability, that the name established for the water system remain the same. A water system number will be assigned to that name.

1.2 Source Information:

Include the source name. Is it a new source or an existing source? Is it a well, spring, or tunnel? Is it an individual source, a wellfield, or a springfield? Is this source already constructed? Include a brief description of the source location.

1.3 Designated Person - R309-600-5:

Include the name, address, and phone number of the designated person. This information must be included in each DWSP plan that is submitted to DDW. Correspondence regarding this report and future correspondence will be directed to the designated person.

2.0 THE DELINEATION REPORT - R309-600-9(5)

Include the following information and a list of all sources or references for the information:

2.1 Geologic Data - R309-600-9(6)(a)(i):

Include a brief description of geologic features and aquifer characteristics observed in the well and area of the potential protection zones. The formal or informal stratigraphic name(s), lithology of the aquifer(s) and confining unit(s), and description of fractures and solution cavities (size, abundance, spacing, orientation) and faults (brief description of location in or near the well, and orientation) should be contained in this section. Lithologic descriptions can be obtained from surface hand samples or well cuttings; core samples and laboratory analyses are not necessary. Fractures, solution cavities, and faults may be described from surface outcrops or drill logs.

2.2 Well or Spring Construction Data - R309-600-9(6)(a)(ii) & (iii):

If the source is a well, include the following information: If the source is a well, the report shall include the well drillers log, elevation of the wellhead, borehole radius, casing radius, total depth of the well, depth and length of the screened or perforated interval(s), well screen or perforation type, casing type, method of well construction, type of pump, location of pump in the well, and the maximum projected pumping rate of the well. The maximum pumping rate of the well must be used in the delineation calculations. Averaged pumping rate values shall not be used.

If the source is a spring or tunnel, include the following information: A description or diagram of the collection area and method of ground-water collection.

2.3 Aquifer Data - R309-600-9(6)(a)(iv):

Include the following aquifer properties:

Calculated hydraulic conductivity obtained from a constant-rate test, transmissivity, hydraulic gradient, direction of ground-water flow, estimated effective porosity, and saturated thickness of the producing aquifer(s).

The constant-rate test shall:

Provide for continuous pumping for at least 24 hours or until stabilized drawdown has continued for at least six hours. Stabilized drawdown is achieved when there is less than 0.5 foot of change of ground-water level in the well within a six-hour period. Additionally, provide data as described in R309-515-6(10)(b).

If a constant-rate aquifer test is not practical, then the hydraulic conductivity of the aquifer must be obtained using another appropriate method, such as data from a nearby well in the same aquifer, specific capacity of the well, published hydrogeologic studies of the same aquifer, or local or regional ground-water models. A constant-rate test may not be practical for such reasons as insufficient drawdown in the well, inaccessibility of the well for water-level measurements, or insufficient overflow capacity for the pumped water.

Additional Data for Observation Wells:

If the aquifer test is conducted using observation wells, the report shall include the following information for each observation well: location and surface elevation; total depth; depth and length of the screened or perforated intervals; radius, casing type, screen or perforation type, and method of construction; pre-pumping ground-water level; the time-drawdown or distance-drawdown data and curve; and the total drawdown.

2.4 Hydrogeologic Methods and Calculations - R309-600-9(6)(a)(vii):

Include the hydrogeologic method used to delineate the protection zones, all applicable equations, values, and the calculations which determine the delineated boundaries of zones two, three, and four. If a computer model was used, include a description of the model and the parameters input into the model, as well as any assumptions behind the model or input values. Include any printouts of the data or graphical presentations from the computer program. Raw data and other output from the computer program may be included in an appendix. The hydrogeologic method or ground-water model must be reasonably applicable for the aquifer setting. For wells, the hydrogeologic method or ground-water model must include the effects of drawdown (increased hydraulic gradient near the well) and interference from other wells.

2.5 Map Showing Boundaries of the DWSP Zones - R309-600-9(6)(a)(viii):

a. A map showing the location of the ground-water source of drinking water and the boundary for each DWSP zone. The base map shall 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 on the map, the complete boundaries for zones two, three, and four must be drawn and labeled. More detailed maps are optional and may be submitted in addition to the map required above.

b. Include a written description of the distances, which define the delineated boundaries of, zones two, three, and four. These written descriptions must include the maximum distance upgradient from the well, the maximum distance downgradient from the well, and the maximum widths of each protection zone.

2.6 Protected or Unprotected Aquifer Classification - R309-600-9(4) & (7):

If the source is a well, indicate whether it meets the following criteria: 1) A naturally protective layer of clay, at least 30 feet in thickness, is present above the aquifer; 2) data to indicate the lateral continuity of the clay layer extends throughout zone two; and 3) the well is constructed 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 (R309-600-6(1)(x). If these criteria are met, the aquifer may be considered to be protected. *If this section is not addressed or the case for protected aquifer status is not properly justified then the aquifer will be classified as unprotected.*

If the PWS is seeking protected aquifer status for the well, and the well meets the criteria explained above, the licensed geologist or licensed engineer must state that the aquifer meets the definition of a protected aquifer based on the following information which must be included in the report: 1) Thickness, depth, and lithology of the protective clay layer; 2) data to indicate the lateral continuity of the protective clay layer over the extent of zone two. This may include such data as correlation of beds in multiple wells, published hydrogeologic studies, stratigraphic studies, potentiometric surface studies, and so forth; and 3) evidence that the well has been grouted or otherwise sealed from the ground surface to a depth of at least 100 feet and for a thickness of at least 30 feet through the protective clay layer in accordance with R309-515-6(1)(v) and R309-600-6(1)(x). Include construction methods. If sufficient information is presented to indicate the ground water will be protected from contaminant sources at the surface, the aquifer may still receive a *protected* designation, even though, the above criteria are not met.

Susceptibility waivers are an important reason for determining whether a source is located in a protected aquifer. Protected aquifer status is the most important criterion that is considered when a PWSs application for a source's susceptibility waivers for the pesticide and VOC parameter groups is reviewed.

3.0 THE INVENTORY OF POTENTIAL CONTAMINATION SOURCES - R309-600-10

The following information about potential contamination sources (PCSs) may be organized in any manner that formats the data into an arrangement that is easy to understand and reference (information sheets, tables, etc.). Ensure that each section (3.1 through 3.5) is addressed.

3.1 List Potential Contamination Sources - R309-600-10(1):

Use the list in Chapter 5 of the Ground Water Source Protection User's Guide and any other appropriate guidance to compile a list of PCSs that are within the four protection zones or the entire management area. The name and address of each commercial and industrial potential contamination source is required. Additional information should include the name and phone number of a contact person. Residential PCSs should be identified individually with addresses or in groups depending on the method the PWS intends to use to contact them for educational purposes.

3.2 Identify Hazards:

List the chemical, biological, and/or radiological substances used, stored, manufactured, transported, and disposed at each PCS. If there are no hazards associated with PCS, it may not, in fact, be a PCS. Refer to Chapter 5 of the Source Protection User's Guide for the definition of a *potential contamination source*.

3.3 Prioritize the Inventory - R309-600-10(1)

Arrange the list of PCSs that are located within the four protection zones or the entire management area into a greatest to least risk priority order and state the basis for the order.

3.4 Potential Contamination Source Location - R309-600-10(1)

Include a description which identifies each PCS as to its location in zone one, two, three, four or in a management area.

3.5 Potential Contamination Sources Plotted on Map

PCSs must be plotted on the map required in Section 2.5a of this document.

4.0 THE IDENTIFICATION AND ASSESSMENT OF CURRENT CONTROLS – R309-600-10(2)

There are four types of hazard controls: Regulatory, best management/pollution prevention, physical, and negligible quantity controls. PWSs are not required to plan and implement land management strategies for potential contamination source 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 date must be established according to the instructions that follow.

Any hazard that is not assessed as *adequately controlled* will be considered to be *not adequately controlled*. Additionally, if the hazards at a PCS cannot be identified, the potential contamination source 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 of the Ground Water Source Protection User's Guide 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 the Ground Water Source Protection User's Guide for a list of government agencies and the programs they administer to control PCSs. This guide may be obtained from DDW.

Identify and Assess Regulatory Controls - R309-600-10(2)(a):

Regulatory controls are the codes, ordinances, rules, and regulations that are in effect to control 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 which 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; and 6) set a date to reassess this control.

Identify and Assess Best Management and Pollution Prevention Practices – R309-600-10(2)(b):

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 and pollution prevention practices: 1) List the specific best management and pollution prevention practices which are being used to control this hazard; 2) indicate that PCS management is willing to continue the use of these practices to prevent ground-water contamination; 3) explain how these best management and 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; and 5) set a date to reassess this control.

Identify and Assess Physical Controls – R309-600-10(2)(c):

Physical controls are man-made structures and impoundments, such as spill protection structures, that are in place to stop a hazard from entering the ground water. The following four steps are required to assess a hazard as adequately controlled by a physical control: 1) Describe the physical control(s) which have 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; and 4) set a date to reassess this control.

Identify and Assess Negligible Quantity Controls – R309-600-10(2)(d):

Negligible quantity controls refer to the amount or toxicity of a hazardous substance that is used at a PCS facility. It means that quantity or toxicity is so low that the risk of ground-water contamination is negligible and not worth the time and effort to plan land management strategies to control it. The following four steps are required to assess a hazard as adequately controlled by a negligible quantity 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; and 4) set a date to reassess this control.

5.0 MANAGEMENT PROGRAM FOR EXISTING POTENTIAL CONTAMINATION SOURCES - R309-600-11

This section is intended to be a well thought out plan that will be implemented by the PWS to control PCS hazards. Land management strategies are required to be planned for each PCS hazard that is assessed as *not adequately controlled*. It is not acceptable for the plan to simply contain a list of land management strategies that are recommended by the consultant. The PWS must concur with the land management strategies, which are included in this report, and be willing to carry them out.

5.1 Plan land management strategies to control the chemical, biological, and radiological substances that have been identified at each PCS that is assessed as *not adequately controlled*. Land management strategies must be planned to control the hazards identified at each PCS and be in accordance with the authority and jurisdiction of the PWS. Land management strategies may be regulatory and/or non-regulatory.

5.2 Include a discussion of the specific best management practices, pollution prevention, and other land management strategies that are being proposed to control potential contamination (refer to Appendix G of the Source Protection User's Guide for "Fact Sheets" that are available from DDW).

6.0 THE MANAGEMENT PROGRAM FOR FUTURE POTENTIAL CONTAMINATION SOURCES - R309-600-12

6.1 Management Program - R309-600-12(4):

If zoning ordinances are used, provide the following information: Discuss specific sections of the zoning ordinance that are planned or that have been promulgated and explain how they control or will control future PCSs.

If zoning ordinances are not used, provide the following information: Identify the plan to contact PCSs individually as they move into protection zones, include them on the inventory of PCSs, identify and assess current controls, and plan land management strategies if they are not adequately controlled.

7.0 THE IMPLEMENTATION SCHEDULE - R309-600-7(1)(e)

The implementation schedule is a list of the land management strategies, which have been identified by the PWS for both existing and future PCSs with a beginning implementation date for each one. Each PCS listed on the inventory required in R309-600-10(1) and assessed as "not adequately controlled" must be addressed. PWSs are required to implement land management strategies as specified in this schedule.

8.0 THE RESOURCE EVALUATION - R309-600-7(1)(f)

Include the resource evaluation, which is a discussion of the financial and other resources that are required for the PWS to implement this DWSP Plan and a determination of how these resources are to be acquired.

9.0 THE RECORDKEEPING SECTION - R309-600-7(1)(g)

As the plan is executed, each land management strategy that is implemented according to the list in the Implementation Schedule must be documented in Recordkeeping Section. 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. This section is also used to document changes as the plan is continuously updated to show current conditions in the protection zones and management areas.

10.0 THE CONTINGENCY PLAN - R309-600-14

Include a contingency plan that addresses all sources of drinking water for the entire water system. This plan is only due once and is usually submitted concurrently with the submission of the first DWSP plan for the system. Guidance for developing Contingency Plans may be found in Chapter 10 of the Ground Water Source Protection User's Guide. This document may be obtained from DDW. *A DWSP plan cannot be concurred with until the requirement for a system contingency plan has been satisfied.*

11.0 PUBLIC NOTIFICATION – R309-600-15

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

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, include a copy of the Public Notification Statement and indicate how it was distributed to your consumers.

Refer to the "Ground Water Source Protection User's Guide" for more information about public notifications.

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 is set forth in R309-205. The criteria for use and susceptibility waivers follow.

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 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:

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 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:

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; 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 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.

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Updated Ground-Water Source Protection Plan – Standard Report Format

All DWSP plans must be updated according to the schedule in Table 1. This standard report format should be followed in preparing Updated Drinking Water Source Protection (DWSP) Plans.

Updated DWSP Plans need not be submitted in their complete form; ***only source protection plan changes and the Implementation Schedule need be addressed.*** This standard report format gives instructions to complete this requirement. However, if your DWSP Plans have become fragmented and are difficult to follow and implement or you have significantly revised your plans because of better data, you may want to reorganize them into comprehensive documents and submit them for complete reviews. This choice should be made considering which type of submittal benefits your public water system most.

All geologic work submitted to DDW must be stamped and signed by a licensed geologist or licensed engineer. This does not apply to geologic work that was completed prior to October 29, 2003.

The following table identifies the deadlines for submitting updated source protection plans:

Population Served by PWS	Source Type	Next Update Due Date
Over 10,000	Well	December 31, 2020
3,300 - 10,000	Well	December 31, 2021
Less than 3,300	Well	December 31, 2022
All Populations	Spring	December 31, 2023

This standard report format has been kept as concise as possible. It may not be a stand-alone document. We suggest that you refer to the *Standard Report Format for Existing Wells and Springs*, if you need additional guidance in addressing a particular section of the source protection plan. Other guidance documents are contained throughout the User's Guide and its appendices.

EXECUTIVE SUMMARY

Include a brief summary of source protection plan changes and land management strategies that have been implemented for this source.

1.0 INTRODUCTION

1.1 System Information:

Water System Name

Water System Number

Address

Phone Number

1.2 Source Information:

Source Name

Source Number

Source Type: Well, Spring, or Tunnel

1.3 Designated Person

Name

Address (if different than system's address)

Phone Number (if different than the system's phone number)

2.0 DELINEATION REPORT

If there are no changes to the delineation report, state that there are "no changes."

If there are changes to the Delineation Report, describe them under the following applicable section headings:

2.1 Geologic Data

2.2 Well or Spring Construction Data

2.3 Aquifer Data

2.4 Hydrogeologic Methods and Calculations

2.5 Map Showing Boundaries of the DWSP Zones

2.6 Protected or Unprotected Aquifer Classification

3.0 INVENTORY OF POTENTIAL CONTAMINATION SOURCES

If there are no changes to the Inventory of Potential Contamination Sources (PCSs), state there are "no changes."

If there are changes to the Inventory of PCSs, describe them under the following applicable section headings:

3.1 List PCSs:

3.1.a PCSs to be deleted from your Inventory of PCSs

3.1.b PCSs to be added to your Inventory of PCSs

3.2 Identify Hazards

3.3 Prioritize the Inventory

3.4 PCS Location: Identify each added PCS as to its location in zone one, two, three, four, or in a management area.

3.5 PCSs Plotted on Map: Remove each PCS from your map that has been deleted from your inventory and include each PCS that has been added to you inventory.

4.0 IDENTIFICATION AND ASSESSMENT OF CURRENT CONTROLS

If there were no new PCSs added to your inventory or if you do not need to reassess any PCSs, state there are "no changes."

If there are changes to the Inventory of PCSs or if you need to reassess any PCSs, describe them under the following applicable section headings:

4.1 Identify and Assess Regulatory Controls

4.2 Identify and Assess Best Management and Pollution Prevention Practices

4.3 Identify and Assess Physical Controls

4.4 Identify and Assess Negligible Quantity Controls

5.0 MANAGEMENT PROGRAM FOR EXISTING POTENTIAL CONTAMINATION SOURCES

If there are no changes to the Management Program for Existing PCSs, state that there are "no changes."

If there are changes to the Management Program for Existing PCSs, describe them according to the following instructions:

This is a good time to evaluate whether the land management strategies you planned in your original source protection plans are working. If not, or if your experience tells you that something will work better, make these changes in this updated source protection plan. Make sure these changes are also reflected in Section 7.0, The Implementation Schedule.

5.1 Plan land management strategies to control the chemical, biological, and radiological substances that have been identified at each PCS and are assessed as *not adequately controlled*.

5.2 Include a discussion of the specific best management practices, pollution prevention, and other land management strategies that are being proposed to control potential contamination.

6.0 MANAGEMENT PROGRAM FOR FUTURE POTENTIAL CONTAMINATION SOURCES

If there are no changes to the Management Program for Future PCSs, state that there are "no changes."

If there are changes to the Management Program for Future PCSs, describe them under the following applicable section headings:

6.1 Management Program

6.1.a *If zoning ordinances are used, provide the following information:* Discuss specific sections of the zoning ordinance that are planned or that have been promulgated and explain how they control or will control future PCSs.

6.1.b *If zoning ordinances are not used, provide the following information:* Identify the plan to contact PCSs individually as they move into protection zones, include them on the inventory of PCSs, identify and assess current controls, and plan land management strategies if they are not adequately controlled.

7.0 IMPLEMENTATION SCHEDULE

The implementation schedule is a list of the land management strategies, which have been identified by the PWS for both existing and future PCSs with an implementation date for each one.

7.1 Include a copy of the Implementation Schedule for this source. This is a list of each land management strategy that has been planned along with its implementation date. This is Section 7, of your Drinking Water Source Protection Plan. Annotate each item on the list that should have already been implemented (has an implementation date that has passed) as "completed" or "not completed." For those items marked "not completed," provide an explanation of your plans for this item in the future. Do you still plan to implement it? Will something else work better? What is its new implementation date?

8.0 RESOURCE EVALUATION

If there are no changes to the Resource Evaluation, state that there are "no changes."

If there are changes to the Resource Evaluation, describe them according to the following instruction:

Include the resource evaluation, which is a discussion of the financial and other resources that are required for the PWS to implement this DWSP Plan and a determination of how these resources are to be acquired.

9.0 RECORDKEEPING SECTION

There should always be changes to this section. It is included for the PWS to document changes as the plan is continuously updated to show current conditions in the protection zones and management areas. ***As the plan is executed, the PWS must document the implementation of each land management strategy as it occurs.*** You must include actual copies of ordinances, codes, permits,

memoranda of understanding, public education programs, training session agendas, minutes of meetings, diary entries, and memoranda for the file, etc.

9.1 Provide documentation for each item that you annotated as "completed" in Section 7.1. Actual copies of any ordinances, codes, permits, memoranda of understanding, public education programs, bill stuffers, newsletters, training session agendas, minutes of meetings, diary entries, and memoranda for the file must be submitted with this section of Updated Drinking Water Source Protection Plans.

10.0 CONTINGENCY PLAN

If there are no changes to the Contingency Plan, state that there are "no changes."

If there are changes to the Contingency Plan, describe them under the following applicable section headings:

10.1 Emergency Response Plans

10.2 Rationing Plans

10.3 Water Supply Decontamination Plans

10.4 Source Development Plans

11.0 PUBLIC NOTIFICATION

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

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, include a copy of the Public Notification Statement and indicate how it was distributed to your consumers.

Refer to the "Ground Water Source Protection User's Guide" for more information about public notifications.

WAIVERS

If you currently have use or susceptibility waivers for VOCs or pesticides, you must submit the following in order for them to remain in effect. It does not matter when they were issued, they must be addressed in your updated plans or they will expire.

Use Waivers

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

1. List any potential contamination sources within zones one, two, and three where the chemicals within the VOC and/or pesticide parameter groups are typically used, disposed, stored, transported, or manufactured. For example, pesticides are usually used on agricultural land and residential property. If there are none, state that there are no potential contamination sources that typically use VOCs or pesticides.

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

To continue 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 the continuance of 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.

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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 ground-water 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.

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Appendix D – Consulting Ground-water Professionals

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 ground-water 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 completed these types of reports in the past. 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 zones, use the same care you would in obtaining the services of any other professional firm. You may want to ask neighboring Public Water Systems for recommendations and referrals.

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 Don Barnett: dbarnett@barnettwater.com	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.: cmikell@bowencollins.com Christopher DeKorver, P.G.: CDeKorver@bowencollins.com	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
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 Richard White, P.E.: rbwhite@earthfax.com	7324 South Union Park Ave. Midvale UT 84047	801-561-1555
Ensign Engineering Kelly Chappell, P.E.: kchappell@ensignutah.com	1870 N Main Street #102 Cedar City, Utah 84721	435-865-1453
Franson Civil Engineers Joshua Prettyman, P.E.: jprettyman@fransoncivil.com	1276 S 820 E American Fork UT 84003	801-756-0309
GEM Engineering, Inc. Joel Myers, P.E.: joel@gemengineeringinc.com	485 North Aviation Way Cedar City UT 84721	435-867-6478
Geo Consultants	580 N Main Cedar City UT 84720	435-586-8089

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Firm	Address	Phone
Granite Environmental, Inc. Austin F. Legler, P.E.	2469 E 7000 S #212 Salt Lake City UT 84121	801-943-1222
King Water Resources Van F. King, P.G.: van@kingwaterresources.com	2498 E Nantucket Drive Salt Lake City, Utah 84121	801-842-3495
Preston L. Hafen Consulting Geologist	115 S Main Veyo UT 84782	435-574-2760
Hansen Allen & Luce Lance Nielsen, P.E.: lance@halengineers.com	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. Ste 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
LRE Water Neil Burk, P.G., Neil.Burk@LREwater.com	PO Box 520517 Salt Lake City, Utah 84152	435-879-3338
Millennium Science & Engineering	2319 Foothill Drive #180 Salt Lake City UT 84108-1488	801-461-0888
North American Exploration	447 N 300 W Ste. 3 Kaysville UT 84037	801-544-3421
Paul Hansen Associates Paul Hansen: 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
Secor International	308 E 4500 S Ste 100 Murray UT 84107-3957	801-266-7100
Stantec Consulting Services, Inc.	2890 E Cottonwood Pkwy Suite 300 Salt Lake City, Utah 84121	801-617-3200
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 Pkwy 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

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Appendix E – 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, UAC) 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 (the Division).

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 Ground-water 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 cannot 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 ground-water is moving through bedrock.

Many books and professional papers have been written that discuss aquifer testing and ground-water 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.

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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 aerially 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.

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UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
DRINKING WATER

Appendix F – Rule R309-600

R309-600. Source Protection: Drinking Water Source Protection For Ground-Water Sources.

R309-600-1. Authority.

Under authority of Section 19-4-104(1)(a)(iv), the Drinking Water Board adopts this rule which governs the protection of ground-water sources of drinking water.

R309-600-2. Purpose.

Public Water Systems (PWSs) are responsible for protecting their sources of drinking water from contamination. R309-600 sets forth minimum requirements to establish a uniform, statewide program for implementation by PWSs to protect their ground-water sources of drinking water. PWSs are encouraged to enact more stringent programs to protect their sources of drinking water if they decide they are necessary.

R309-600 applies to ground-water sources and to ground-water sources which are under the direct influence of surface water which are used by PWSs to supply their systems with drinking water. However, compliance with this rule is voluntary for existing ground-water sources of drinking water which are used by public (transient) non-community water systems.

R309-600-3. Implementation.

(1) New Ground-Water Sources - Each PWS shall submit a Preliminary Evaluation Report (PER) in accordance with R309-600-13(2) for each of its new ground-water sources to the Division of Drinking Water (DDW). A PWS shall not begin construction of a new source until the Director concurs with its PER.

(2) Existing Ground-Water Sources - Each PWS shall submit a Drinking Water Source Protection (DWSP) Plan in accordance with R309-600-7(1) for each of its existing ground-water sources to DDW according to the following schedule. Well fields or groups of springs may be considered to be a single source.

TABLE 1

Population Served By PWS:	Percent of Sources:	DWSP Plans Due By:
Over 10,000	50% of wells	December 31, 1995
Over 10,000	100% of wells	December 31, 1996

3,300-10,000	100% of wells	December 31, 1997
Less than 3,300	100% of wells	December 31, 1998
Springs and other sources	100%	December 31, 1999

(3) DWSP for existing ground-water sources under the direct influence of surface water shall be accomplished through delineation of both the ground water and surface water contribution areas. The requirements of R309-600-7(1) apply to the ground water portion and the requirements of R309-605 apply to the surface water portion, except that the schedule for submitting these DWSP plans to DDW is based on the schedule in R309-605-3(1).

(4) PWSs shall maintain all land use agreements which were established under previous rules to protect their ground-water sources of drinking water from contamination.

R309-600-4. Exceptions.

(1) Exceptions to the requirements of R309-600 or parts thereof may be granted by the Director to PWSs if: due to compelling factors (which may include economic factors), a PWS is unable to comply with these requirements, and the granting of an exception will not result in an unreasonable risk to health.

(2) The Director may prescribe a schedule by which the PWS must come into compliance with the requirements of R309-600.

R309-600-5. Designated Person.

(1) A designated person shall be appointed and reported in writing to the Director by each PWS within 180 days of the effective date of R309-600. The designated person's address and telephone number shall be included in the written correspondence. Additionally, the above information must be included in each DWSP Plan and PER that is submitted to DDW.

(2) Each PWS shall notify the Director in writing within 30 days of any changes in the appointment of a designated person.

R309-600-6. Definitions.

(1) The following terms are defined for the purposes of this rule:

(a) "Collection area" means the area surrounding a ground-water source which is underlain by collection pipes, tile, tunnels, infiltration boxes, or other ground-water collection devices.

(b) "Controls" means the codes, ordinances, rules, and regulations currently in effect to regulate a potential contamination source. "Controls" also means physical controls which

may prevent contaminants from migrating off of a site and into surface or ground water. "Controls" also means negligible quantities of contaminants.

(c) "Criteria" means the conceptual standards that form the basis for DWSP area delineation to include distance, ground-water time of travel, aquifer boundaries, and ground-water divides.

(d) "Criteria threshold" means a value or set of values selected to represent the limits above or below which a given criterion will cease to provide the desired degree of protection.

(e) "DDW" means Division of Drinking Water.

(f) "DWSP Program" means the program to protect drinking water source protection zones and management areas from contaminants that may have an adverse effect on the health of persons.

(g) "DWSP Zone" means the surface and subsurface area surrounding a ground-water source of drinking water supplying a PWS, through which contaminants are reasonably likely to move toward and reach such ground-water source.

(h) "Designated person" means the person appointed by a PWS to ensure that the requirements of R309-600 are met.

(i) "Director" means the Director of the Division of Drinking Water.

(j) "Engineer" means a person licensed under the Professional Engineers and Land Surveyors Licensing Act, 58-22 of the Utah Code, as a "professional engineer" as defined therein.

(k) "Existing ground-water source of drinking water" means a public supply ground-water source for which plans and specifications were submitted to DDW on or before July 26, 1993.

(l) "Geologist" means a person licensed under the Professional Geologist Licensing Act, 58-76 of the Utah Code, as a "professional geologist" as defined therein.

(m) "Ground-water Source" means any well, spring, tunnel, adit, or other underground opening from or through which ground-water flows or is pumped from subsurface water-bearing formations.

(n) "Hydrogeologic methods" means the techniques used to translate selected criteria and criteria thresholds into mappable delineation boundaries. These methods include, but are not limited to, arbitrary fixed radii, analytical calculations and models, hydrogeologic mapping, and numerical flow models.

(o) "Land management strategies" means zoning and non-zoning strategies 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.

(p) "Land use agreement" means a written agreement wherein the owner(s) agrees not to locate or allow the location of uncontrolled potential contamination sources or pollution sources within zone one of new wells in protected aquifers. The owner(s) must also agree not to locate or allow the location of pollution sources within zone two of new wells in unprotected aquifers and new springs unless the pollution source agrees to install design standards which prevent contaminated discharges to ground water. This restriction must be binding on all heirs, successors, and assigns. Land use agreements must be recorded with the property description in the local county recorder's office. Refer to R309-600-13(2)(d).

Land use agreements for protection areas on publicly owned lands need not be recorded in the local county recorder office. However, a letter must be obtained from the Administrator of the land in question and meet the requirements described above.

(q) "Management area" means the area outside of zone one and within a two-mile radius where the Optional Two-mile Radius Delineation Procedure has been used to identify a protection area.
For wells, 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 elevation 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 may also 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.

(r) "New ground-water source of drinking water" means a public supply ground-water source of drinking water for which plans and specifications are submitted to DDW after July 26, 1993.

(s) "Nonpoint source" means any diffuse source of pollutants or contaminants not otherwise defined as a point source.

(t) "PWS" means public water system.

(u) "Point source" means any discernible, confined, and discrete source of pollutants or contaminants, including but not limited to any site, pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, animal feeding operation with more than ten animal units, landfill, or vessel or other floating craft, from which pollutants are or may be discharged.

(v) "Pollution source" means point source discharges of contaminants to ground water 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, landfilling of sludge and septage, manure piles, salt piles, pit privies, drain lines, and animal feeding operations with more than ten animal units.

The following definitions are part of R309-600 and clarify the meaning of "pollution source:"

(i) "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.

(ii) "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.

(iii) "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 the Emergency Planning and Community Right-to-Know Act (EPCRA) and Section 112(R) of the Clean Air Act, As Amended," (550B98017). A copy of this document may be obtained from: NCEPI, PO Box 42419, Cincinnati, OH 45202. Online ordering is also available at http://www.epa.gov/ncepihom/orderpub.html.

(w) "Potential contamination source" means any facility or site which employs an activity or procedure which may potentially contaminate ground water. A pollution source is also a potential contamination source.

(x) "Protected aquifer" means a producing aquifer in which the following conditions are met:

(i) A naturally protective layer of clay, at least 30 feet in thickness, is present above the aquifer;

(ii) the PWS provides data to indicate the lateral continuity of the clay layer to the extent of zone two; and

(iii) 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 for a thickness of at least 30 feet through the protective clay layer.

(y) "Replacement well" means 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:

(i) 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

(ii) 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).

(z) "Time of travel" means the time required for a particle of water to move in the producing aquifer from a specific point to a ground-water source of drinking water.

(aa) "Unprotected aquifer" means any aquifer that does not meet the definition of a protected aquifer.

(bb) "Wellhead" means the physical structure, facility, or device at the land surface from or through which ground-water flows or is pumped from subsurface, water-bearing formations.

R309-600-7. DWSP Plans.

(1) Each PWS shall develop, submit, and implement a DWSP Plan for each of its ground-water sources of drinking water.

Required Sections for DWSP Plans - DWSP Plans should be developed in accordance with the "Standard Report Format for Existing Wells and Springs." This document may be obtained from DDW. DWSP Plans must include the following seven sections:

(a) DWSP Delineation Report - A DWSP Delineation Report in accordance with R309-600-9(6) is the first section of a DWSP Plan.

(b) Potential Contamination Source Inventory and Assessment of Controls - A Prioritized Inventory of Potential Contamination Sources and an assessment of their controls in accordance with R309-600-10 is the second section of a DWSP Plan.

(c) Management Program to Control Each Preexisting Potential Contamination Source - A Management Program to Control Each Preexisting Potential Contamination Source in accordance with R309-600-11 is the third section of a DWSP Plan.

(d) Management Program to Control or Prohibit Future Potential Contamination Sources - A Plan for Controlling or Prohibiting Future Potential Contamination Sources is the fourth section of a DWSP Plan. This must be in accordance with R309-600-12, consistent with the general provisions of this rule, and implemented to an extent allowed under the PWS's authority and jurisdiction.

(e) Implementation Schedule - Each PWS shall develop a step-by-step implementation

schedule which lists each of its proposed land management strategies with an implementation date for each strategy.

(f) Resource Evaluation - Each PWS shall assess the financial and other resources which may be required for it to implement each of its DWSP Plans and determine how these resources may be acquired.

(g) Recordkeeping - Each PWS shall document changes in each of its DWSP Plans as they are continuously updated to show current conditions in the protection zones and management areas. As a DWSP Plan is executed, the PWS shall document any land management strategies that are implemented. These documents may include any of the following: ordinances, codes, permits, memoranda of understanding, public education programs, public notifications, and so forth.

(2) DWSP Plan Administration - DWSP Plans shall be submitted, corrected, retained, implemented, updated, and revised according to the following:

(a) Submitting DWSP Plans - Each PWS shall submit a DWSP Plan to DDW in accordance with the schedule in R309-600-3 for each of its ground-water sources of drinking water.

(b) Correcting Deficiencies - Each PWS shall correct any deficiencies in a disapproved DWSP Plan and resubmit it to DDW within 90 days of the disapproval date.

(c) Retaining DWSP Plans - Each PWS shall retain on its premises a current copy of each of its DWSP Plans.

(d) Implementing DWSP Plans - Each PWS shall begin implementing each of its DWSP Plans in accordance with its schedule in R309-600-7(1)(e), within 180 days after submittal if they are not disapproved by the Director.

(e) Updating and Resubmitting DWSP Plans - Each PWS shall update its DWSP Plans as often as necessary to ensure they show current conditions in the DWSP zones and management areas. Updated plans also document the implementation of land management strategies in the recordkeeping section. 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. must be submitted with the recordkeeping section of updated plans. DWSP Plans are initially due according to the schedule in R309-600-3. Thereafter, updated DWSP Plans are due every six years from their original due date. This applies even though a PWS may have been granted an extension beyond the original due date.

(f) Revising DWSP Plans - Each PWS shall submit a revised DWSP Plan to DDW within 180 days after the reconstruction or redevelopment of any ground-water source of drinking water which addresses changes in source construction, source development, hydrogeology, delineation, potential contamination sources, and proposed land management strategies.

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R309-600-8. DWSP Plan Review.

(1) The Director shall review each DWSP Plan submitted by PWSs and "concur," "concur with recommendations," "conditionally concur" or "disapprove" the plan. The Director may also authorize the designated DDW Source Protection Manager to issue the following actions: "concur" and "concur with recommendations."

(2) The Director may "disapprove" DWSP Plans for any of the following reasons:

(a) An inaccurate DWSP Delineation Report, a report that uses a non-applicable delineation method, or a DWSP Plan that is missing this report or any of the information and data required in it (refer to R309-600-9(6));

(b) an inaccurate Prioritized Inventory of Potential Contamination Sources or a DWSP Plan that is missing this report or any of the information required in it (refer to R309-600-10(1));

(c) an inaccurate assessment of current controls (refer to R309-600-10(2));

(d) a missing Management Program to Control Each Preexisting Potential Contamination Source which has been assessed as "not adequately controlled" by the PWS (refer to R309-600-11(1));

(e) a missing Management Program to Control or Prohibit Future Potential Contamination Sources (refer to R309-600-12);

(f) a missing or incomplete Implementation Schedule, Resource Evaluation, Recordkeeping Section, Contingency Plan, or Public Notification Plan (refer to R309-600-7(1)(e)-(g), R309-600-14, and R309-600-15).

(3) The Director may "concur with recommendations" when PWSs propose management programs to control preexisting potential contamination sources or management programs to control or prohibit future potential contamination sources for existing or new drinking water sources which appear inadequate or ineffective.

(4) The Director may "conditionally concur" with a DWSP Plan or PER. The PWS must implement the conditions and report compliance the next time the DWSP Plan is due and submitted to DDW.

R309-600-9. Delineation of Protection Zones and Management Areas.

(1) PWSs shall delineate protection zones or a management area around each of their ground-water sources of drinking water using the Preferred Delineation Procedure or the Optional Two-mile Radius Delineation Procedure. The hydrogeologic method used by PWSs shall produce protection zones or a management area in accordance with the criteria thresholds below. PWSs may also choose to verify protected aquifer conditions to reduce the level of management controls applied in applicable protection areas.

(2) Reports must be prepared by a qualified licensed professional - A submitted report which addresses any of the following sections shall be stamped and signed by a professional geologist or professional engineer:

(a) A Delineation Report for Estimated DWSP Zones produced using the Preferred Delineation Procedure, as explained in R309-600-13(2)(a);

(b) a DWSP Delineation Report produced using the Preferred Delineation Procedure, as explained in R309-600-9(3)(a) and (6)(a);

(c) a report to verify protected aquifer conditions, as explained in R309-600-9(4) and (7);

(d) a report which addresses special conditions, as explained in R309-600-9(5); or

(e) a Hydrogeologic Report to Exclude a Potential Contamination Source, as explained in R309-600-9(6)(b)(ii).

(3) Criteria Thresholds for Ground-water Sources of Drinking Water:

(a) Preferred Delineation Procedure - Four zones are delineated for management purposes:

(i) Zone one is the area within a 100-foot radius from the wellhead or margin of the collection area.

(ii) 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. If the available data indicate a zone of increased ground-water velocity within the producing aquifer(s), then time-of-travel calculations shall be based on this data.

(iii) 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. If the available data indicate a zone of increased ground-water velocity within the producing aquifer(s), then time-of-travel calculations shall be based on this data.

(iv) 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 available data indicate a zone of increased ground-water velocity within the producing aquifer(s), then time-of-travel calculation shall be based on this data.

(b) Optional Two-mile Radius Delineation Procedure - In place of the Preferred Delineation Procedure, PWSs may choose to use the Optional Two-mile Radius Delineation Procedure to delineate a management area. This procedure is best applied in remote areas where few if any potential contamination sources are located. Refer to R309-600-6(1)(q) for

the definition of a management area.

(4) Protected Aquifer Classification - PWSs may choose to verify protected aquifer conditions to reduce the level of management controls for a public-supply well which produces water from a protected aquifer(s) or to meet one of the requirements of a VOC or pesticide susceptibility waiver (R309-600-16(4)). Refer to R309-600-6(1)(x) for the definition of a "protected aquifer."

(5) Special Conditions - Special scientific or engineering studies may be conducted to support a request for an exception (refer to R309-600-4) due to special conditions. These studies must be approved by the Director before the PWS begins the study. Special studies may include confined aquifer conditions, ground-water movement through protective layers, wastewater transport and fate, etc.

(6) DWSP Delineation Report - Each PWS shall submit a DWSP Delineation Report to DDW for each of its ground-water sources using the Preferred Delineation Procedure or the Optional Two-mile Radius Delineation Procedure.

(a) Preferred Delineation Procedure - Delineation reports for protection zones delineated using the Preferred Delineation Procedure shall include the following information and a list of all sources or references for this information:

(i) Geologic Data - A brief description of geologic features and aquifer characteristics observed in the well and area of the potential protection zones. This should include the formal or informal stratigraphic name(s), lithology of the aquifer(s) and confining unit(s), and description of fractures and solution cavities (size, abundance, spacing, orientation) and faults (brief description of location in or near the well, and orientation). Lithologic descriptions can be obtained from surface hand samples or well cuttings; core samples and laboratory analyses are not necessary. Fractures, solution cavities, and faults may be described from surface outcrops or drill logs.

(ii) Well Construction Data - If the source is a well, the report shall include the well drillers log, elevation of the wellhead, borehole radius, casing radius, total depth of the well, depth and length of the screened or perforated interval(s), well screen or perforation type, casing type, method of well construction, type of pump, location of pump in the well, and the maximum projected pumping rate of the well. The maximum pumping rate of the well must be used in the delineation calculations. Averaged pumping rate values shall not be used.

(iii) Spring Construction Data - If the source is a spring or tunnel the report shall include a description or diagram of the collection area and method of ground-water collection.

(iv) Aquifer Data for New Wells - A summary report including the calculated hydraulic conductivity of the aquifer, transmissivity, hydraulic gradient, direction of ground-water flow, estimated effective porosity, and saturated thickness of the producing aquifer(s). The PWS shall obtain the hydraulic conductivity of the aquifer from a constant-rate aquifer test and provide the data as described in R309-515-

6(10)(b). Estimated effective porosity must be between 1% and 30%. Clay layers shall not be included in calculations of aquifer thickness or estimated effective porosity. This report shall include graphs, data, or printouts showing the interpretation of the aquifer test.

(v) Aquifer Data for Existing Wells - A summary report including the calculated hydraulic conductivity of the aquifer, transmissivity, hydraulic gradient, direction of ground-water flow, estimated effective porosity, and saturated thickness of the producing aquifer(s). The PWS shall obtain the hydraulic conductivity of the aquifer from a constant-rate aquifer test using the existing pumping equipment. Aquifer tests using observation wells are encouraged, but are not required. If a previously performed aquifer test is available and includes the required data described below, data from that test may be used instead. Estimated effective porosity must be between 1% and 30%. Clay layers shall not be included in calculations of aquifer thickness or estimated effective porosity. This report shall include graphs, data, or printouts showing the interpretation of the aquifer test.

If a constant-rate aquifer test is not practical, then the PWS shall obtain hydraulic conductivity of the aquifer using another appropriate method, such as data from a nearby well in the same aquifer, specific capacity of the well, published hydrogeologic studies of the same aquifer, or local or regional ground-water models. A constant-rate test may not be practical for such reasons as insufficient drawdown in the well, inaccessibility of the well for water-level measurements, or insufficient overflow capacity for the pumped water.

The constant-rate test shall:

> (A) Provide for continuous pumping for at least 24 hours or until stabilized drawdown has continued for at least six hours. Stabilized drawdown is achieved when there is less than one foot of change of ground-water level in the well within a six-hour period.
>
> (B) Provide data as described in R309-515-6(10)(b)(v) through (vii).

(vi) Additional Data for Observation Wells - If the aquifer test is conducted using observation wells, the report shall include the following information for each observation well: location and surface elevation; total depth; depth and length of the screened or perforated intervals; radius, casing type, screen or perforation type, and method of construction; prepumping ground-water level; the time-drawdown or distance-drawdown data and curve; and the total drawdown.

(vii) Hydrogeologic Methods and Calculations - These include the ground-water model or other hydrogeologic method used to delineate the protection zones, all applicable equations, values, and the calculations which determine the delineated boundaries of zones two, three, and four. The hydrogeologic method or ground-water model must be reasonably applicable for the aquifer setting. For wells, the hydrogeologic method or ground-water model must include the effects of drawdown (increased hydraulic gradient near the well) and interference from other wells.

(viii) Map Showing Boundaries of the DWSP Zones - A map showing the location of the ground-water source of drinking water and the boundary for each DWSP zone. The base map shall 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 on the map, the complete boundaries for zones two, three, and four must be drawn and labeled. More detailed maps are optional and may be submitted in addition to the map required above.

The PWS shall also include a written description of the distances which define the delineated boundaries of zones two, three, and four. These written descriptions must include the maximum distances upgradient from the well, the maximum distances downgradient from the well, and the maximum widths of each protection zone.

(b) Optional Two-Mile Radius Delineation Procedure - Delineation Reports for protection areas delineated using the Optional Two-mile Radius Delineation Procedure shall include the following information:

(i) Map Showing Boundaries of the DWSP Management Area - A map showing the location of the ground-water source of drinking water and the DWSP management area boundary. The base map shall 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 rea) need not be 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.

(ii) Hydrogeologic Report to Exclude a Potential Contamination Source - To exclude a potential contamination source from the inventory which is required in R309-600-10(1), a hydrogeologic report is required which clearly demonstrates that the potential contamination source has no capacity to contaminate the source.

(7) Protected Aquifer Conditions - If a PWS chooses to verify protected aquifer conditions, it shall submit the following additional data to DDW for each of its ground-water sources for which the protected aquifer conditions apply. The report must state that the aquifer meets the definition of a protected aquifer based on the following information:

(a) thickness, depth, and lithology of the protective clay layer;

(b) data to indicate the lateral continuity of the protective clay layer over the extent of zone two. This may include such data as correlation of beds in multiple wells, published hydrogeologic studies, stratigraphic studies, potentiometric surface studies, and so forth; and

(c) evidence that the well has been grouted or otherwise sealed from the ground surface to a depth of at least 100 feet and for a thickness of at least 30 feet through the protective clay layer in accordance with R309-600-6(1)(x) and R309-515-6(6)(i).

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R309-600-10. Potential Contamination Source Inventory and Identification and Assessment of Controls.

(1) Prioritized Inventory of Potential Contamination Sources - Each PWS shall list all potential contamination sources within each DWSP zone or management area in priority order and state the basis for this order. This priority ranking shall be according to relative risk to the drinking water source. The name and address of each commercial and industrial potential contamination source is required. Additional information should include the name and phone number of a contact person and a list of the chemical, biological, and/or radiological hazards associated with each potential contamination source. Additionally, each PWS shall identify each potential contamination source as to its location in zone one, two, three, four or in a management area and plot it on the map required in R309-600-9(6)(a)(viii) or R309-600-9(6)(b)(i).

(a) List of Potential Contamination Sources - A List of Potential Contamination Sources is found in the "Source Protection User's Guide for Ground-Water Sources." This document may be obtained from DDW. This list may be used by PWSs as a guide to inventorying potential contamination sources within their DWSP zones and management areas.

(b) Refining, Expanding, Updating, and Verifying Potential Contamination Sources - Each PWS shall update its list of potential contamination sources to show current conditions within DWSP zones or management areas. This includes adding potential contamination sources which have moved into DWSP zones or management areas, deleting potential contamination sources which have moved out, improving available data about potential contamination sources, and all other appropriate refinements.

(2) Identification and Assessment of Current Controls - PWSs are not required to plan and implement land management strategies for potential contamination source hazards that are assessed as "adequately controlled." If controls are not identified, the potential contamination source will be considered to be "not adequately controlled." Additionally, if the hazards at a potential contamination source cannot be identified, the potential contamination source must be assessed as "not adequately controlled." Identification and assessment should be limited to one of the following controls for each applicable hazard: regulatory, best management/pollution prevention, physical, or negligible quantity. Each of the following topics for a control must be addressed before identification and assessment will be considered to be complete. Refer to the "Source Protection User's Guide for Ground-Water Sources" for a list of government agencies and the programs they administer to control potential contamination sources. This guide may be obtained from DDW.

(a) Regulatory Controls - Identify the enforcement agency and verify that the hazard is being regulated by them; cite and/or quote applicable references in the regulation, rule or ordinance which pertain to controlling the hazard; explain how the regulatory control prevents ground-water contamination; assess the hazard; and set a date to reassess the hazard.

(b) Best Management/Pollution Prevention Practice Controls - List the specific best management/pollution prevention practices which have been implemented by potential

contamination source management to control the hazard and indicate that they are willing to continue the use of these practices; explain how these practices prevent ground-water contamination; assess the hazard; and set a date to reassess the hazard.

(c) Physical Controls - Describe the physical control(s) which have been constructed to control the hazard; explain how these controls prevent contamination; assess the hazard; and set a date to reassess the hazard.

(d) Negligible Quantity Control - Identify the quantity of the hazard that is being used, disposed, stored, manufactured, and/or transported; explain why this amount should be considered a negligible quantity; assess the hazard; and set a date to reassess the hazard.

(3) For the purpose of meeting the requirements of R309-600, the Director will consider a PWS's assessment that a potential contamination source which is covered by a permit or approval under one of the regulatory programs listed below sufficient to demonstrate that the source is adequately controlled unless otherwise determined by the Director. For all other state programs, the PWS's assessment is subject to review by the Director; as a result, a PWS's DWSP Plan may be disapproved if the Director does not concur with its assessment(s).

(a) The Utah Ground-Water Quality Protection program established by Section 19-5-104 and R317-6;

(b) closure plans or Part B permits under authority of the Resource Conservation and Recovery Act (RCRA) of 1984 regarding the monitoring and treatment of ground water;

(c) the Utah Pollutant Discharge Elimination System (UPDES) established by Section 19-5-104 and R317-8;

(d) the Underground Storage Tank Program established by Section 19-6-403 and R311-200 through R311-208; and

(e) the Underground Injection Control (UIC) Program for classes I-IV established by Sections 19-5-104 and 40-6-5 and R317-7 and R649-5.

R309-600-11. Management Program to Control Each Preexisting Potential Contamination Source.

(1) PWSs shall plan land management strategies to control each preexisting potential contamination source in accordance with their authority and jurisdiction. Land management strategies must be consistent with the provisions of R309-600, designed to control potential contamination, and may be regulatory or non-regulatory. Each potential contamination source listed on the inventory required in R309-600-10(1) and assessed as "not adequately controlled" must be addressed. Land management strategies must be implemented according to the schedule required in R309-600-7(1)(e).

(2) PWSs with overlapping protection zones and management areas may cooperate in controlling a

particular preexisting potential contamination source if one PWS will agree to take the lead in planning and implementing land management strategies and the remaining PWS(s) will assess the preexisting potential contamination source as "adequately controlled."

R309-600-12. Management Program to Control or Prohibit Future Potential Contamination Sources for Existing Drinking Water Sources.

(1) PWSs shall plan land management strategies to control or prohibit future potential contamination sources within each of its DWSP zones or management areas consistent with the provisions of R309-600 and to an extent allowed under its authority and jurisdiction. Land management strategies must be designed to control potential contamination and may be regulatory or non-regulatory. Additionally land management strategies must be implemented according to the schedule required in R309-600-7(1)(e).

(2) Protection areas may extend into neighboring cities, towns, and counties. Since it may not be possible for some PWSs to enact regulatory land management strategies outside of their jurisdiction, except as described below, it is recommended that these PWSs contact their neighboring cities, towns, and counties to see if they are willing to implement protective ordinances to prevent ground-water contamination under joint management agreements.

(3) Cities and towns have extraterritorial jurisdiction in accordance with Section 10-8-15 of the Utah Code Annotated to enact ordinances to protect a stream or "source" from which their 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..." Section 10-8-15 includes ground-water sources.

(4) Zoning ordinances are an effective means to control potential contamination sources that may want to move into protection areas. They allow PWSs to prohibit facilities that would discharge contaminants directly to ground water. They also allow PWSs to review plans from potential contamination sources to ensure there will be adequate spill protection and waste disposal procedures, etc. If zoning ordinances are not used, PWSs must establish a plan to contact potential contamination sources individually as they move into protection areas, identify and assess their controls, and plan land management strategies if they are not adequately controlled.

R309-600-13. New Ground-water Sources of Drinking Water.

(1) 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 Director will not grant plan approval until both source protection and engineering requirements are met. Construction standards relating to protection zones and management areas (fencing, diversion channels, sewer line construction, and grouting, etc.) are found in R309-515. After the source is constructed a DWSP Plan must be developed, submitted, and implemented accordingly.

(2) Preliminary Evaluation Report for New Sources of Drinking Water - PERs shall cover all four zones or the entire management area. PERs should be developed in accordance with the "Standard Report Format for New Wells and Springs." This document may be obtained from DDW. PWSs shall include the following four sections in each PER:

(a) Delineation Report for Estimated DWSP Zones - The same requirements apply as in R309-600-9(6), except that the hydrogeologic data for the PER must be developed using the best available data which may be obtained from: surrounding wells, published information, or surface geologic mapping. PWSs must use the Preferred Delineation Procedure to delineate protection zones for new wells. The Delineation Report for Estimated DWSP Zones shall be stamped and signed by a professional geologist or professional engineer unless the Optional Two-Mile Radius Delineation Procedure is used for a new spring.

(b) Inventory of Potential Contamination Sources and Identification and Assessment of Controls - The same requirements apply as in R309-600-10(1) and (2). Additionally, the PER must demonstrate that the source meets the following requirements:

(i) Protection Areas Delineated using the Preferred Delineation Procedure in Protected Aquifers - A PWS shall not locate a new ground-water source of drinking water where an uncontrolled potential contamination source or a pollution source exists within zone one.

(ii) Protection Areas Delineated using the Preferred Delineation Procedure in Unprotected Aquifers - A PWS shall not locate a new ground-water source of drinking water where an uncontrolled potential contamination source or an uncontrolled pollution source exists within zone one. Additionally, a new ground-water source of drinking water may not be located where a pollution source exists within zone two unless the pollution source implements design standards which prevent contaminated discharges to ground water.

(iii) Management Areas Delineated using the Optional Two-Mile Radius Delineation Procedure - A PWS shall not locate a new spring where an uncontrolled potential contamination source or a pollution source exists within zone one. Additionally, a new spring may not be located where a pollution source exist within the management area unless: a hydrogeologic report in accordance with R309-600-9(6)(b)(ii) which verifies that it does not impact the spring; or the pollution source implements design standards which prevent contaminated discharges to ground water.

(c) Land Ownership Map - A land ownership map which includes all land within zones one and two or the entire management area. 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 in which they own land. A land ownership map and list are not required if ordinances are used to protect these areas.

(d) 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). Zoning ordinances which 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 in 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.

(3) Sewers Within DWSP Zones and Management Areas - Sewer lines may not be located within zones one and two or a management area unless the criteria identified below are met. If sewer lines are located or planned to be located within zones one and two or a management area, the PER must demonstrate that they comply with these criteria. Sewer lines that comply with these criteria may be assessed as adequately controlled potential contamination sources.

(**a) Unprotected Aquifers** -

(i) Zone one - all 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.

(ii) Zone two - all sewer lines and laterals within zone two or a management area shall be constructed in accordance with R309-515-6.

(b) Protected Aquifers - in zone one all sewer lines and laterals shall be constructed in accordance with R309-515-6, and shall be at least 10 feet from the wellhead or margin of the collection area.

(4) Use waivers for the VOC and pesticide parameter groups may be issued if the inventory of potential contamination sources indicates that the chemicals within these parameter groups are not used, disposed, stored, transported, or manufactured within zones one, two, and three or the management area.

(5) Replacement Wells - A PER is not required for proposed wells, if the PWS receives written notification from the Director 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 conditions required in R309-600-6(1)(y) are met. If a proposed well is classified as a replacement well, the PWS is still required to submit and obtain written approval for all other information as required in:

(a) DWSP Plan for New Sources of Drinking Water (refer to R309-600-13(6), and

(b) the Outline of Well Approval Process (refer to R309-515-6(5)).

(6) DWSP Plan for New Sources of Drinking Water - The PWS shall submit a DWSP Plan in accordance with R309-600-7(1) for any new ground-water source of drinking water within one year after the date of the Director's concurrence letter for the PER. In developing this DWSP Plan, PWSs shall refine the information in the PER by applying any new, as-constructed characteristics of the source (i.e., pumping rate, aquifer test, etc.).

R309-600-14. Contingency Plans.

PWSs shall submit a Contingency Plan which includes all sources of drinking water for their entire water system to DDW concurrently with the submission of their first DWSP Plan. Guidance for developing Contingency Plans may be found in the "Source Protection User's Guide for Ground-Water Sources." This document may be obtained from DDW.

R309-600-15. Public Notification.

A PWSs consumers must be notified that its DWSP plans are available for their review. This notification must be released to the public by December 31, 2003. Public notifications shall address all of the PWS's sources and include the following:

(a) A discussion of the general types of potential contamination sources within the protection zones;

(b) an analysis that rates the system's susceptibility to contamination as low, medium, or high; and

(c) a statement that the system's complete DWSP plans are available to the public upon request.

Examples of means of notifying the public and examples of public notification material are discussed in the "Source Protection User's Guide for Ground-Water Sources" which may be obtained from DDW.

R309-600-16. Monitoring Reduction Waivers.

(1) Three types of monitoring waivers are available to PWSs. They are: a) reliably and consistently, b) use, and c) susceptibility. The criteria for establishing a reliably and consistently waiver is set forth in R309-205. The criteria for use and susceptibility waivers follow.

(2) If a source's DWSP plan is due according to the schedule in R309-600-3, and is not submitted to DDW, its use and susceptibility waivers for the VOC and pesticide parameter groups (refer to R309-205-6(1)(e) and (f); and (R309-205-6(2)(h) and (i)) will expire 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. Monitoring reduction waivers must be renewed every six years at the time the PWSs Updated DWSP Plans are due and be addressed therein.

(3) Use Waivers - If the chemicals within the VOC and/or pesticide parameter group(s) (refer to R309-200 table 200-3 and 200-2) have not been used, disposed, stored, transported, or manufactured 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:

(a) 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

(b) 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.

(4) 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 steps:

(a) 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;

(b) 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

(c) 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.

(5) 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 the Director before the PWS begins the study. Special waiver condition studies may include:

(a) geology and construction/grout seal of the well to demonstrate geologic protection;

(b) 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;

(c) public education programs which address best management practices for VOCs and/or pesticides;

(d) contaminant quantities;

(e) affected land area; and/or

(f) 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 the Director.

KEY: drinking water, environmental health
Date of Enactment or Last Substantive Amendment: November 6, 2017
Notice of Continuation: March 13, 2015
Authorizing, and Implemented or Interpreted Law: 19-4-104(1)(a)(iv)

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Appendix G – Potential Contamination Source Survey Form

Priority Rank # _____ Zone _____

Potential Contamination Source (PCS): _____

Activity: _____

Contact Person: _____ Owner/Operator:_____

Address/Location: _____ Telephone: _____

Identify Potential Contamination Source Hazard(s)

Place amount next to those chemical/hazards listed below that are used, disposed, stored, transported, or manufactured by this PCS: 20,000 gal stored, 400 gal discharged/day, or 10 lbs. applied/acre/year are examples of how to enter amounts:

Chemical	Amount	Chemical	Amount
PCB		Dioxin	
Crude Oil		Gasoline	
Diesel Oil		Other Distillate Fuel	
Asphalt		Animal or Vegetable Oil	
Waste Oil		Other Oil	
Petroleum Solvents		Naphtha	
Mineral Spirits		Vermin Poisons	
Insecticides		Nematicides	
Herbicides		Fungicides	
Antibiotics		Fertilizers	
Metals		Acids	
Organic Solvents		Caustics	
Alcohols		Amines	
Aldehydes		Radioactive Material	
Brines		Sewage/Wastewater	

Unknown/Other

Describe _____

Amount : _____

List copies of Material Safety Data Sheets (MSDSs) for the substances circled above that the potential contamination source furnished you (chemical manufacturers or importers will furnish missing MSDSs upon request):

If this potential contamination source produces any waste streams, list them:

Does this potential contamination source result in any nonpoint source pollution? Describe:

Identify Controls

There are four types of controls which may be used to assess a potential contamination source hazard as adequately controlled. Check the control which applies to this hazard (choose only one):

- □ Regulatory
- □ Operational
- □ Physical
- □ Negligible Quantity

If this is a regulatory control, cite specific references in the regulation, rule, or ordinance which pertain to controlling this hazard:

If this is a regulatory control, identify the enforcement agency:

If this a regulatory control, have you verified that this hazard is actually being regulated by the enforcement agency: Yes □ or No □

If this is an operational control, list the best management practices/pollution prevention techniques which are being used to control this hazard:

If this is a physical control (excluding geology), describe it:

If this is a negligible quantity control, identify the hazardous substance and quantity being used:

Explain how this control will prevent ground-water contamination:

Is this hazard adequately controlled: Yes □ or No □
If yes, no further land management strategies will be planned and implemented unless conditions change.

Set a reassessment date for this control:

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Appendix H – State, Local, and Federal Authorities

State Agencies

The Division of Water Quality

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

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UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
DRINKING WATER

Appendix I – Potential Contamination Source Fact Sheets

General information about potential contamination sources (PCSs) is contained in the Fact Sheets contained in this appendix. 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:

Dry Cleaning

Fertilizer

Household Hazardous Waste

Metal Finishers

Pesticides

Pollution Prevention

Printing Shops

Septic Tank/Drain-field Systems

Vehicle Maintenance & Repair

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UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
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Dry Cleaning Fact Sheet

How Dry Cleaning Works

Dry cleaning is not, in fact, really "dry." Dry cleaning is a method that cleans clothes without using water. Instead of water, the process uses a liquid to dissolve other substances (a solvent). The solvent generally used in dry cleaning is perchloroethylene (PCE), a chlorinated cleaner. PCE dissolves grease and oil from clothing without wetting the fibers. Any dirt that remains is then mechanically removed by the action of the dry cleaning machine.

Typical wastes generated by dry cleaners include spent PCE, still bottom residues from distillation of solvents, spent filter cartridges, cooked powder residue, and water contaminated with PCE. Although not every cleaning facility produces hazardous waste, those facilities that use solvents in the cleaning process are likely to be subject to the Resource Conservation and Recovery Act (RCRA) and state requirements that cover the generation, transportation and management of hazardous waste. All hazardous wastes must be managed and disposed of legally.

Good Housekeeping

Good housekeeping measures can greatly decrease the amount of wastes that are generated. To reduce excess waste production:

- Keep tight fitting lids on containers to prevent loss of chemicals through evaporation or spillage. Keeping lids on containers also prevents mixing with water, dirt or other materials.
- Use spigots and pumps when dispensing new materials and funnels when transferring wastes to storage containers to reduce the possibility of spills.
- Provide secondary containment in areas where PCE and PCE wastes are stored.
- Store products in locations that will preserve their shelf life.
- Never mix different types of wastes together. Mixing wastes may make recycling impossible, or make waste disposal much more expensive.
- Eliminate both liquid and vapor leaks by conducting a regular maintenance program:

    1. Periodically replace the seals on the dryer deodorizer and aeration valves, the door gasket on the button trap and the gasket on the cleaning machine door.
    2. Repair holes in air and exhaust ducts.
    3. Check hose connections and couplings.
    4. Clean lint screens to avoid clogging fans and condensers.
    5. Check baffle assembly in cleaning machine.
    6. Check air relief valves for proper closure.

7. Monitor for vapor losses with solvent leak detectors.

8. Check to see that your water/solvent separator is working correctly. If there is an unusually large amount of PCE in your collection bucket, it is not working correctly.

- Track your solvent "mileage" (pounds of clothes per drum of PCE, to make sure your equipment is running efficiently. If mileage drops, call your equipment supplier for assistance.
- Adjust water flow through condensing coil so that entry and exit temperatures are within 100< F of each other.

Substitute Raw Materials

Consider replacing your current raw materials with raw materials that reduce the amount or toxicity of the waste that you generate. For example, if you use a solvent other than PCE, use one, which is not considered ignitable. You should always take into consideration the cost of disposal when you are deciding what raw materials to purchase.

Modify Your Process

If you are currently using a wet-to-dry cleaning unit, consider replacing it with a dry-to-dry unit. In wet-to-dry units, you lose solvent in the transfer process. Use refrigerated condensation systems to reduce vapor losses.

Solvent Recycling

There are several methods you can use to reclaim PCE from your system. PCE is expensive, so the more that is recovered, the more money is saved. Recycling methods include:

- Distilling your spent PCE in a distillation unit.
- Capturing the PCE vapors, which are vented from your machine and passing them through an activated carbon filter. Passing steam in reverse, through the carbon filter, then reclaims the PCE.
- Using "sniffers" to draw in the PCE vapors from the shop and then using the carbon filter process to reclaim the PCE.

Water Recycling

Water that has been in contact with PCE is a hazardous waste. Whenever possible, reuse it in your dry cleaning equipment. It should never be put into a septic system and should not enter a sewer without the permission from your sewer utility.

Personnel Training

Workers need proper training for their health and safety, for the health of your business, and for the health of the environment. Research has shown this is the most critical step in pollution prevention.

Energy and Material Conservation Program

- Try to use the latest technology. New equipment may require less energy to operate.
- Identify all materials that are used in the facility. Evaluate how much is going into products and how much into waste.
- Monitor your water and electric meters routinely. Identify peaks and valleys for usage during the day and week. Determine if there are activities that consume water and electricity that could be curtailed during non-production hours.

For More Information, Contact:

Division of Drinking Water, Source Protection Staff - (801) 536-4200

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UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
DRINKING WATER

Fertilizer Fact Sheet

What Are The Potential Hazards?

Fertilizer applied to plants during crop, lawn, and garden maintenance may leach into the ground water and cause contamination. The main constituent in fertilizer is usually nitrogen. If the nitrate level of drinking water is too high, infants, up to the age of six months, can develop a fatal disease called blue baby syndrome (methemoglobenemia). Drinking water that contains 10 milligrams of nitrate-nitrogen per liter of water exceeds the drinking water standard and should not be used, especially for infant formula. Proper storage, application, and watering procedures should be included in fertilizer best management practices to prevent contamination of ground water.

Storing Fertilizers

The less fertilizer you buy, the less you will have to store. Therefore, only purchase the amount and kind of fertilizer that you need.

- Fertilizer should be stored in locked, dry cabinets.
- Keep fertilizer and pesticides on separate shelves.
- Don't store fertilizers with combustibles, such as gasoline and kerosene. This creates an extreme explosion hazard.

Application Precautions

The chemical in fertilizer that can most easily pollute ground water is a form of nitrogen called nitrate. Nitrate moves readily in soil to the ground water strata. The best way to prevent the movement of nitrate into the ground water is to apply no more nitrogen than the crops, grass, garden plants, shrubs, or trees can use during the time that the plants are growing.

- Calibrate your spreader and sprayer to keep from applying too much fertilizer.
- Load fertilizer spreaders on the driveway or other hard surfaces so any spills can easily be swept up. Fertilizer that spills should be swept up and applied to the lawn or garden at the right time and amount. This allows the fertilizer to grow plants instead of washing off into the storm drain system and ultimately contaminating nearby streams and lakes.
- If you are using liquid fertilizer on your turf, add fertilizer to the spray tank while on the lawn. This way, if you spill the fertilizer, it will be used by the plants and not run off into the storm drain system.
- Do not spray or apply fertilizer near irrigation wells. Wells are conduits to the ground water.

Application Rates for Lawns

Utah State University's Extension Service recommends the following for Utah lawns: ☐It is important to fertilize on a regular basis every four to six weeks to maintain an attractive lawn. Begin when lawns start

to green in the spring, mid to late April. Earlier applications may cause a lawn to become greener faster, but may also increase spring disease problems. Summer applications of nitrogen fertilizer will not burn lawns, if you apply them to dry grass and water immediately. Fall applications are important for good winter cold tolerance, extended fall color, and fast spring green-up. A complete fertilizer containing nitrogen, phosphorus and potassium should be applied in the fall every three to four years. This will prepare the lawn for winter conditions and allow the phosphorus to penetrate into the root zone by the next growing season.

For a well-kept lawn in Utah, apply 1 pound of available nitrogen per 1,000 square feet each four to six weeks throughout the growing season.

Types of Plants

One of the best ways to protect your groundwater is to use plants that are drought-tolerant and that are adapted to your area. Drought-tolerant or low-water-use plants can continue to survive once they are established, even during times of little rainfall. Because you do not have to water these plants, there is less chance that nitrate and pesticides will be carried with the water through the soil and into the groundwater.

If low-water-use plants are not practical, then try to use medium water use plants. Water these plants only when they begin to show drought stress. Some plants will wilt when they are drought-stressed, while other plants will show marginal leaf burn.

Watering

Over-watering plants can cause excess water to move through the soil. This water can flush fertilizer away from the root zone of your plants and into the ground water. The best way to avoid over-watering is simply to measure how much you are adding. Contact your county Extension Service to determine the best way to calculate how much water your plants need and how to measure the amount you are applying.

For More Information, Contact:

Division of Drinking Water, Source Protection Program - (801) 536-4200

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
DRINKING WATER

Household Hazardous Waste Fact Sheet

What is Household Hazardous Waste?

Many hazardous products and chemicals such as fuel, cleaners, oils and pesticides are used in and around the home every day. When improperly discarded, these products are called household hazardous waste (HHW). HHWs are discarded materials and products that are ignitable, corrosive, reactive, toxic or otherwise listed as hazardous by the EPA. Products used and disposed of by a typical residence may contain more than 100 hazardous substances including:

- Batteries
- Cleaners
- Cosmetics
- Fluorescent light bulbs
- Glues
- Heating oil
- Insecticides and pesticides
- Ink
- Medicines
- Motor oil, fuel and automotive supplies
- Paints, thinners, stains and varnishes
- Polishes
- Swimming pool chemicals
- Smoke detectors
- Thermometers
- Fuel

HHW is a Serious Threat

The U.S. Environmental Protection Agency estimates the average American household generates 20 pounds of HHW each year. As much as 100 pounds of HHW can accumulate in the home and remain there until the resident moves or undertakes a thorough spring cleaning.

Since the chemicals found in HHW can cause soil and groundwater contamination, generate hazardous emissions at landfills and disrupt water treatment plants, it is important to dispose of HHW properly. Many solid waste treatment facilities are currently required to screen for HHW to avoid operating under restrictive hazardous waste laws. Furthermore, many communities may be required to establish a HHW collection program in order to qualify for permits to manage storm water.

Safe Handling Tips

The best way to handle household hazardous materials is to completely use the product before disposing of the container. If this is not possible, then the next alternative is to return unused portions to your community household hazardous waste clean-up day. Keep products in their original package with all labels intact. If the container is leaking, place it in a thick plastic bag. Pack the products in a plastic-lined cardboard box to prevent leaks and breakage.

Household hazardous waste clean-up days are for household wastes only. No industrial or commercial wastes and no containers larger than five gallons are accepted. Explosives, radioactive material and medical wastes are also unacceptable.

HHW can be dangerous to people and pets who come in contact with them. HHW can endanger water supplies, damage sewage treatment systems, and cause other environmental damage. Only use the products as directed. **DO NOT:**

- Flush HHWs down the toilet
- Pour HHWs down the sink
- Pour HHWs down a storm drain
- Pour HHWs on the ground

Contact your local health department or the Division of Solid and Hazardous Waste to determine whether your community has a household hazardous waste collection program.

Identify HHW

Reduce the amount of potentially hazardous products in your home and eliminate what you throw away by following these easy steps:

1. **Before you buy:**

- Read the labels and be aware of what they mean.
- Look for these words on labels; they tell you what products may need special handling or disposal.

Caution	Flammable
Combustible	Poison
Corrosive	Toxic
Danger	Volatile
Explosive	Warning

- Buy only what you can use entirely.
- Select a product best suited for the job.

2. **After you buy:**

- Read label precautions and follow directions for safe use.
- Recycle/dispose of empty containers properly. Clean up spilled products properly.
- Share what you can't use with friends or neighbors.
- Store properly.
- Use recommended amounts; more is not necessarily better.
- Use the child-resistant closures and keep them on tightly.

For More Information, Please Contact:

Division of Drinking Water, Source Protection Program - (801) 536-4200

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
DRINKING WATER

Metal Finisher Fact Sheet

There are over 31,000 metal finishing facilities in the United States that generate hazardous waste from their production processes. Pollution prevention (P2) and the reduction of hazardous waste generation can save money and reduce future liabilities. Typical wastes generated are:

- Industrial wastewater and treatment residues
- Spent plating baths
- Spent process bathsSpent cleaners
- Waste solvents and oils

Waste Reduction

Both state and federal regulations require large quantity generators of hazardous waste to file a biennial generator's report including a description of efforts undertaken and achievements accomplished during the reporting period to reduce the volume and toxicity of hazardous waste generated.

Pollution prevention and waste minimization practices reduce the amount of waste generated, reduce the amount of waste subject to regulation, and help businesses comply with the requirements while saving money. Management commitment to P2 and waste minimization is just a beginning. Passing that on to employees through training in P2, waste minimization, hazardous waste handling, emergency response, and incentive programs for new waste reduction ideas is critical for success.

Source Reduction

Waste assessments are used to list the sources, types and amounts of hazardous waste generated to make it easier to pinpoint where wastes can be reduced. Source reduction is usually the least expensive approach to prevent or minimize waste. Many of these techniques involve housekeeping changes or minor in-plant process modifications.

Improved Procedures and Segregated Wastes

- Keep work areas clean.
- Improve inventory procedures to reduce the amount off-specification materials generated.
- Designate protected raw materials and hazardous waste storage areas with spill containment.
- Keep the areas clean and organized and give one person the responsibility for maintaining the areas.
- Label containers as required and cover them to prevent contact with rainfall and to avoid spills.
- Use a "first in, first-out" policy for raw materials to keep them from becoming too old to be used.
- Give one-person responsibility for maintaining and distributing raw materials.
- Designate one person to accept chemical samples and return unused samples to suppliers.
- Limit bath mixing to trained personnel.
- Segregate waste streams for recycling and treatment, and to keep non-hazardous materials from being contaminated.
- Prevent and contain spills and leaks by installing drip trays and splashguards around processing equipment.
- Conduct periodic inspections of tanks, tank liners, and other equipment to avoid failures.
- Repair malfunctions when they are discovered. Use inspection logs to follow up on repairs.
- Inspect plating racks for loose insulation that would cause increased drag-out.
- Use dry cleanup where possible to reduce the volume of wastewater.

Material Substitution

- Use process chemicals that are recyclable or treatable on-site.
- Use deionized water instead of tap water in process baths and/or rinsing operations to reduce sludge volume.
- Use non-chelated process chemistries to reduce sludge volume.
- Use non-cyanide process baths to simplify treatment required.
- Use alkaline cleaners instead of solvents for degreasing operations. They can be treated on-site and usually discharged to the sewer with permit authorization.

Extending Process Bath Life

- Treatment (filtration, electrolytic dummying) of process baths can extend their useful life.
- Bath replenishment extends the useful life of the bath.
- Monitoring (using pH meters or conductivity meters) the process baths can determine the need for bath replenishment.

Drag-Out Reduction

- Minimize bath concentrations to the lower end of their operating range.
- Maximize bath operating temperatures to lower the solution's viscosity.
- Use wetting agents (which reduce the surface tension of the solution) in process baths to decrease the amount of drag-out.
- Withdraw work pieces from tanks slowly to allow maximum drainage back into process tank.
- Use air knives or spray rinses above process tanks to rinse excess solution off work piece and into process bath.
- Install drainage boards between process tanks and rinse tanks to route drag-out back to process tank.
- Use dedicated drag-out tanks after process baths to capture drag-out.
- Install rails above process tanks to hang work piece racks for drainage prior to rinsing.

Rinse Systems

- Use spray rinses as initial rinse after process tank and before dip tank.
- Use air agitation or work piece agitation to improve rinse efficiency.
- Install multiple rinse tanks (including counter flow rinse tanks) after process baths to improve rinse efficiency and reduce water consumption.

Recycling and Resource Recovery

- Reactive rinsing reuses the acid rinse wastewater as the in-take for the alkaline rinse tank. This allows the fresh water feed to the alkaline rinse tank to be turned off. This can also be applied to process tank rinses.
- Treat rinse wastewater to recover process bath chemicals. This allows the reuse of the waste water for rinsing or neutralization prior to discharge.
- Reuse the spent by-products from the process baths in the wastewater treatment process.
- Recycle spent solvents on-site or off-site.
- Use treatment technologies to recycle rinse waters in a closed or open loop system.
- Some recycling and most treatment processes require a permit. Be sure to contact the state Division of Solid and Hazardous Waste to determine if you need a permit to treat or recycle your wastes.

Treatment Alternatives

- Pre-treat process water to reduce the natural contaminants that contribute to sludge volume.
- Use treatment chemicals that reduce sludge generation (e.g., caustic soda instead of lime).
- Use sludge de-watering equipment to reduce sludge volume.
- Use treatment technologies (such as ion exchange, evaporation, or electrolytic metal recovery) that do not use standard precipitation/clarification methods, which generate heavy metal sludge.

For More Information, Please Contact:

Division of Drinking Water, Source Protection Program - (801) 536-4200

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UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
DRINKING WATER

Pesticides Fact Sheet

What Are The Potential Hazards?

Pesticides applied to plants during crop, lawn, and garden maintenance may leach into the ground water and cause contamination. Proper storage, mixing, application, spill cleanup, watering, and disposal procedures should be included in pesticide best management practices.

Storing Pesticides

The fewer pesticides you buy, the fewer you will have to store. Therefore, only purchase the amount and kind of pesticide that is needed. Pesticides should always be stored in sound, properly labeled, original containers. ***Sound containers are the first defense against spills and leaks.***

- Ensure that there are no holes, tears, or weak seams in the containers and that the label is readable.
- Pesticides should be stored in locked, dry cabinets.
- Be sure to store dry products above liquids to prevent wetting from spills.
- Storage and mixing areas should not be located near floor drains of any kind.
- Storage facilities should have secondary containment, such as a berm or dike, which will hold spills or leaks at:
    - 10% of the total volume of the containers, or
    - 110% of the volume of the largest container, whichever is larger.

Mixing Pesticides

- Mix pesticides on an impermeable surface, such as concrete, so any spills will be contained.
- Mix only the amount that you will use:
    - Measure the total square feet you intend to treat.
    - Read the label on the pesticide container and follow the instructions. (These are often given in terms of amount of pesticide to use per thousand square feet.)
    - By properly measuring and calculating, there should be little or no pesticide left in the spray tank when the job is finished and it will be applied at the recommended rate.

Applying Pesticides

Pesticides are used to kill or control weeds (herbicides), insects (insecticides) and fungi (fungicides) that attack plants. Some of these pesticides can move through the soil and into the ground water. Guidelines for the safe use of pesticides are listed below:

- Be willing to accept a low level of weed, insect, and plant disease infestation.
- Use pesticides only when absolutely necessary.
- Identify pests correctly. Use the proper pesticides.
- Read and follow the directions printed on the container labels. Remember, the label is the law.

- Calibrate your spreader and sprayer to keep from applying too much pesticide.
- Do not spray or apply pesticides near irrigation wells. Wells are conduits to the ground water.
- Do not spray or apply pesticides near your walks and driveway. This prevents them from washing off into the storm drain system.

Cleaning Up Spills

- Dry formulated pesticide spills should be swept up and applied to crops, lawns, and gardens at the rate specified on the label.
- Liquid pesticide spills should be soaked up using absorbent material (such as, soil, sawdust, and cat litter). The contaminated absorbent material should then be put in a sealed container and taken to a household hazardous waste collection site.

Watering

Over-watering your plants can cause excess water to move through the soil. This water can carry pesticides that can contaminate the ground water. The best way to avoid over-watering is simply to measure how much you are adding. Contact your county Extension Service to determine the best way to calculate how much water your plants need and how to measure the amount you are applying.

Disposing of Pesticides

If the pesticide was properly measured and mixed, there should be little or no spray left in the tank. The little that may be left can be safely sprayed over the area that was treated until it is gone. Disposal of empty pesticide containers and unused pesticides should be handled as follows:

- If you are using liquid pesticides, rinse the container three times. Be sure to pour the rinsing into your sprayer and not down a drain or onto the ground. Containers, which have been emptied and rinsed, can be discarded in the trash.
- Unused pesticides in their original containers can be recycled at household hazardous waste collection sites.

For More Information, Please Contact:

Division of Drinking Water, Source Protection Program - (801) 536-4200

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
DRINKING WATER

Pollution Prevention Fact Sheet

Pollution Prevention (P2) uses source reduction techniques and practices to reduce or eliminate the amount of hazardous substances, pollutants or contaminants entering any waste stream or being released into the environment. In short, P2 means not creating waste in the first place while reducing risks to public health, welfare, and the environment.

Pollution Prevention is Good Business

While most pollution control strategies cost money, P2 has saved many businesses thousands of dollars in treatment and disposal costs. Other economic benefits include:

- Reduced operating costs.
- Savings from reduced need for pollution control equipment.
- Elimination of waste transportation, storage, disposal and liability costs.
- Reduced compliance costs from government regulations.
- Improved public image.
- Stimulating reinvestment and enhancing competitiveness.
- Reducing risk of spills, accidents and emergencies.
- Increasing environmental protection.

P2 Techniques

Generating less waste is the best way businesses can practice pollution prevention. This can be achieved through:

- Inventory management: Tracking all raw materials and improving operations.
- Substitute non-hazardous materials for hazardous materials.
- Improving material receiving, storage, and handling practices.
- Modifying and redesigning equipment to enhance recovery and recycling.
- Improved operating efficiency of equipment.
- Establishing strict preventive maintenance programs.
- Segregating wastes for recovery.
- Separating hazardous & non-hazardous wastes to prevent cross-contamination.
- Eliminating sources of leaks and spills.
- Use of water soluble cleaning agents in place of organic solvents and degreasers.

Management Support

The support of company management is essential for developing a lasting and successful P2 program. This commitment should be passed on to employees, especially those working in areas that generate hazardous waste. Management approaches may include the following:

- Make P2 a part of the company policy, a process of continuous improvement.
- Target goals for reducing the volume and toxicity of waste streams.
- Implement recommendations identified through waste assessments.
- Reward employees who identify cost-effective P2 opportunities.
- Train employees in P2 hazardous material waste handling and emergency response procedures.

Good Housekeeping

Most successful P2 waste assessments identify sources of waste and calculate the true cost of waste generation and management. A little extra attention paid to minor sources of waste can result in major reductions. Improved housekeeping practices, system adjustments, process and product inspections, and the use of production unit control equipment and methods are often successful P2 practices. Others include:

- Inspect and repair equipment to reduce waste caused by equipment failure, leaks and spills.
- Contain leaks and spills by using drip trays and splashguards.
- Keep containers closed except when material is added or withdrawn.
- Utilize a “first-in first-out” inventory policy to avoid losses due to expirations.

Product Substitution

Some companies are so motivated by pollution prevention practices they change the products they produce in order to employ nonhazardous production processes. For example, they may change the design, specifications, or composition of an existing end product to reduce the need for toxic materials, which can help reduce pollution and associated costs.

Process Modification

Inefficient or outdated production processes that could be sources of hazardous waste generation can be upgraded or replaced by a more efficient process.

- Changes in the placement order of equipment.
- Equipment modification.
- Changes in operation settings and schedules.
- Process automation.

For More Information, Please Contact:

Division of Drinking Water, Source Protection Program - (801) 536-4200

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
DRINKING WATER

Printing Shop Fact Sheet

Pollution prevention (P2) is the reduction or elimination of harmful pollutants discharged or introduced to the environment. Pollution prevention reduces the generation of wastes at their source by using, reusing or reclaiming wastes once they are generated.

Pollution prevention is good business

While most pollution control strategies cost money, P2 has saved many firms thousands of dollars in treatment and disposal costs alone. By reducing or eliminating wastes a firm can:

- Reduce operating costs for energy, waste disposal, water and raw materials.
- Protect workers, the public and the environment.
- Reduce risk of spills, accidents and emergencies.
- Reduce vulnerability to lawsuits and improve its public image.

Printing is a chemical-intensive industry. The cost of disposing of hazardous and non-hazardous wastes can provide printing firms with tremendous incentives to reduce the generation of wastes. The volume or toxicity of waste produced by the printing industry may be reduced through source reduction, recycling and product substitution.

Trash and Recyclable Waste Paper

The printing industry produces waste paper in large quantities. The volume of waste paper can be reduced through recycling, improved operating procedures, and equipment changes.

- Recycle waste paper for use in pulp, paper and paper containers.
- Utilize improved start-up procedures to reduce waste to a minimum.
- Use improved maintenance to reduce the occurrence of unexpected machine downtime.
- Recycle spoiled photographic film and paper by sending it out to silver reclaimers.

Waste Lubricating Fluids from Machinery

Lubricating fluids used in most machinery may be contaminated with hazardous materials, such as lead or cadmium. If not recycled, they should be disposed of properly.

Segregate used oil from solvents or other materials.

Recycle used oil or burn for energy in accordance with applicable regulations.

Waste Chemicals, Inks, and Solvents

Certain printing processes produce waste chemicals, inks or solvents. The following methods can reduce the volume or toxicity of these wastes:

- Use silver-free films for contact operations. Recover silver to the maximum extent possible.
- Use water-based developed lithographic plates or wipe-on plates.
- Prolong the potency of oxidation process baths by reducing their exposure to air.

- Recover waste solvents on-site with batch distillation or use professional solvent recyclers.
- Fill ink fountains with only enough ink for the run or shift and return unemulsified inks to their containers. Use anti-skinning aerosols to prevent ink dry-up during shutdowns.
- Recycle empty containers by purchasing ink in bulk containers that can be returned to the supplier for refilling. Recycle used and leftover inks.
- Use water-based inks in gravure and flexographic printing processes.
- Use electronic imaging and laser plate making if possible.
- Only use the amount of solvent from the container necessary to complete the cleaning task.
- Use automatic cleaning equipment to promote more efficient use of cleaning solvent.
- Substitute less toxic solvents, such as hexane, for the highly toxic aromatic solvents. Use detergent solutions instead of solvents.
- Segregate spent solvents according to color and type of ink. Reuse the collected wastes to thin future batches of the same ink.
- Use press wipes as long as possible before discarding or laundering. Use dirty ones for the first pass, clean ones for the second pass.
- Set up an in-house dirty rag cleaning operation.

Process Wastewater

Certain printing processes produce waste chemicals and wastewater. The following methods can reduce the volume or toxicity of these wastes:

- Employ counter-current washing instead of parallel rinse systems to reduce process solution contamination and water usage. Reuse rinse water as long as possible.
- Eliminate once through cooling water for equipment and air compressors.
- Use squeegees to wipe off excess liquid in a non-automated processing system to minimize process bath contamination. This procedure increases the ease with which the bath can be recycled, prolongs bath life, and reduces the amount of replenisher chemicals required.
- Monitor and accurately add replenisher chemicals to process baths to reduce chemical wastes.
- Run similar jobs on the same day, or schedule jobs using light colored inks before darker ones. This may reduce the amount of equipment cleaning required between runs.
- Dedicate presses for various ink colors, if feasible. This will result in fewer cleanups. Dedicate one press for inks containing hazardous pigments or solvents.

Pollution prevention is everyone's responsibility. Management can demonstrate its commitment to pollution prevention and encourage employee participation by: Training employees in pollution prevention techniques, encouraging employee suggestions, providing incentives for employee participation, and providing resources necessary to get the job done.

For More Information, Please Contact:

Division of Drinking Water, Source Protection Program - (801) 536-4200

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
DRINKING WATER

Septic Tank/Drainfield Fact Sheet

What Are The Potential Hazards?

Septic systems can contaminate ground water if they are misused, improperly maintained, or improperly constructed. The major contaminant discharged from septic systems is disease-causing germs. These germs (bacteria and viruses) - can cause many human diseases. Another contaminant discharged from septic systems is nitrogen in the form of nitrate. If the nitrate level of drinking water is too high, infants, up to the age of six months old, can develop a fatal disease called blue baby syndrome (methemoglobenemia). Additionally, if toxic chemicals are disposed in a septic system, they can percolate through the drain-field and into the ground water.

How Does a Septic Tank/Drain-field System Work?

The basic septic system is composed of a septic tank followed by a drain-field. Wastewater flows out of the house and into the septic tank through the building sewer pipe. Once in the septic tank, most solids in the wastewater settle to the bottom of the tank to form a sludge layer. Other solids float and form a scum layer on top of the wastewater. Some decomposition of solid material takes place here, but the primary function of a septic tank is to trap solids and prevent them from entering the drain-field.

Wastewater treatment is restricted to a rather thin zone of unsaturated soil underlying the drain-field. Many of the harmful bacteria and microbes are filtered out as the wastewater passes through this soil. Some of the smaller microbes (viruses) and nutrients such as phosphorus and some forms of nitrogen are trapped and held (adsorbed) by soil particles. Once the effluent reaches the groundwater table, little treatment occurs. Soils can differ markedly in their pollutant removal efficiency. The ability to which soil can remove pollutants in the wastewater determines how many impurities will eventually reach the groundwater beneath the drain-field.

Site Evaluation And Construction

Current rules require a comprehensive evaluation of the soil and ground water before a septic system can be permitted for construction in a given location. This evaluation must be reviewed and approved by the local health department. The rules require that the bottom of the drain-field trenches be placed at least 12 inches (preferably 24 inches) above the water table. Additionally, there must be adequate amounts of unsaturated soil beneath the trenches to allow sufficient treatment of the wastewater.

Site Considerations

Trees and deep-rooted shrubs should be as far away from the system as possible.

Keep the water that runs off of foundation drains, gutters, driveways, and other paved areas away from the drain-field of your septic system.

Keep the soil over the drain-field covered with grass to prevent soil erosion.

Don’t drive vehicles over the system.

Don’t cover the tank or drain-field with concrete or asphalt and don’t build over these areas.

Proper Disposal Practices

Use only a moderate amount of cleaning products and do not pour solvents or other household hazardous waste down the drains.

Garbage disposals should not be used because they tend to overload the system with solids. If you have one, you should severely limit its use.

Do not pour grease or cooking oil down the sink.

Do not put items down the drain that may clog the septic tank or other parts of the system. These items include cigarette butts, sanitary napkins, tampons, condoms, disposable diapers, paper towels, eggshells, and coffee grounds.

Water Conservation

There are limits to the amount of wastewater a septic system can treat. If you overload the system, wastewater may backup into your home or surface over your drain-field. Problems caused by using too much water can occur periodically throughout the year or be seasonal. For example, the soil beneath your drain-field is wetter in the spring than it is in the summer and its capacity to percolate wastewater is somewhat diminished. If you wash all your laundry in one day, you may have a temporary problem caused by overloading the soil's capacity to percolate wastewater for that day. To reduce the risk of using too much water, try the following:

Use 1.6 gallons (or less) per flush toilets.

Fix leaking toilets and faucets immediately.

Use faucet aerators at sinks and flow reducing nozzles at showers.

Limit the length of your shower to 10 minutes or less.

Do not fill the bathtub with more than 6 inches of water.

Do not wash more than one or two loads of laundry per day.

Do not use the dishwasher until it is full.

Septic Tank Cleaning

It is recommended that the solids that collect in your septic tank be pumped out and disposed at an approved location every three to five years. If not removed, these solids will eventually be discharged from the septic tank into the drain-field and will clog the soil in the absorption trenches. If the absorption trenches are clogged, sewage will either back up into the house or surface over the drain-field. If this happens, pump the tank will not solve the problem and a new drain-field will probably need to be constructed on a different part of the lot.

For More Information, Please Contact:

Division of Drinking Water, Source Protection Program - (801) 536-4200

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
DRINKING WATER

Vehicle Maintenance and Repair Fact Sheet

Background

Vehicle repair shops generate regulated waste, either from the services they provide, such as fluid replacement, or from operations they perform, such as parts washing. Some common waste types include:

Degreasers

Engine fluids (oil, antifreeze)

Floor dust

Floor wash water

Lead acid batteries

Metal parts/scrap

Oily waste sump sludge

Spent solvents

Paints and thinners

Paper products (masking paper, cardboard, office paper.)

Rags and absorbents

Refrigerants

Tires

Here are some options vehicle maintenance and repair companies can use to reduce waste.

Train Employees to use Good Housekeeping Practices

- Implement spill prevention measures to reduce products from entering the environment.
- Perform preventative maintenance on equipment and vehicles.
- Check incoming vehicles for leaking fluids. Use drip pans to prevent spillage.
- Prevent non-hazardous material from getting contaminated by segregating waste streams.
- Monitor your inventory in storage to reduce accumulation of over-age products.
- Implement a “first-in first-out” policy.

Substitute Materials

- Look for ways to replace solvents with water based cleaners.
- Substitute detergent-based solutions for caustic solutions when cleaning.
- Substitute non-asbestos brake lining for asbestos brake lining.
- Purchase materials in non-aerosol form.
- Use biodegradable floor cleaners.
- Use non-chlorinated brake cleaners.

Modify Processes

- Pre-rinse parts with spent cleaning solution.

- Remove parts slowly after immersion in solvent solution to prevent spillage.
- Use a still rinse solvent sink rather than a free running rinse.
- Cover or plug solvent sinks when not in use to prevent evaporation.
- Replace solvent parts washers with a hot water washer or jet spray.
- Place cleaning equipment in a convenient location near the service bays to reduce drips and spills.
- Change spray-painting process to high volume, low pressure process which will minimize paint lost due to over-spray.

Recycle

- Recyclable waste streams should be segregated to prevent cross-contamination.
- Oils and antifreeze should be collected and recycled.
- Lease or purchase solvent sinks and recycle solvent on or off site.
- Send tires, batteries, and metal parts to a recycler.
- Contract a linen service that will supply clean rags and collect dirty ones for washing.
- Purchase a recycling system to recover refrigerant. Reuse containers within the facility or through a drum salvage company.
- An oil/water separator should be used before water is diverted to sewer.

For More Information, Please Contact:

Division of Drinking Water, Source Protection Program - (801) 536-4200

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
DRINKING WATER

Appendix J – Use Waiver Application

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
DRINKING WATER

Use Waiver Application for:

Name of Water System _____

Name of Drinking Water Source(s) _____

I, _____, Designated Person (per R309-600) for the __ _____Water System, hereby state that none of the volatile organic chemicals and/or pesticides within the respective parameter groups have been used in, disposed of, stored in, transported through, or manufactured within protection zones one, two or three (or within the management area, if applicable) in the last five years.

Signature:_____

Date:_____

Note: if applicable, you must provide a list of the chemicals used in, disposed of, stored in, transported through, or manufactured within protection zones one, two or three where the use of such chemicals within the volatile organic chemicals and/or pesticide parameter groups is likely.

In general, the presence of residences or roads (other than very limited use roads) through zones one, two or three implies that pesticides and volatile organic chemicals are used, and a use waiver in those cases would not be granted.

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
DRINKING WATER

Appendix K – Susceptibility Waiver Application

UTAH DEPARTMENT of ENVIRONMENTAL QUALITY
DRINKING WATER

Susceptibility Waiver Application for:

Name of Water System: _____

Name of Drinking Water Source(s) _____

I, _____, Designated Person (per R309-600) for the _____ Water System, hereby state that I am confident that a susceptibility waiver for VOCs and/or pesticides will not threaten public health.

Signature:_____

Date:_____

Note: We must have a record of the monitoring results of at least one sample from the VOC and/or pesticide parameter group taken in the last five years. A non-detect result is required.