SKYLINE MOUNTAIN SPECIAL SERVICE DISTRICT

DRINKING WATER SOURCE PROTECTION PLAN 2016 UPDATE

THADS PEAK WELL

(HAL Project No.: 299.03.301)

June 2016

HANSEN ALLEN & LUCE inc
ENGINEERS

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EXECUTIVE SUMMARY

This report is the Drinking Water Source Protection (DWSP) Plan for Skyline Mountain Special Service District's (District) Thads Peak Well. The well serves as a portion of the source of drinking water within the District's boundaries. Source protection areas for the well have been delineated as defined in R309-600-9 (DDW, 2003).

No changes have been made to the operation of the Thads Peak Well since the last Drinking Water Source Protection Plan was last updated in 2004. On a visit toThads Peak Well by HAL on May 4, 2016, however, it was observed that the well location mapped in the previous delineation report was approximately 1,000 feet from the correct location. Because the corrected location places the well further from the fault which acts as a barrier to groundwater flow, the DWSP zones were re-delineated using the same hydrogeologic characteristics assumed in the previous DWSP Plan

The Potential Contamination Source (PCS) inventory was conducted by Hansen, Allen, and Luce Inc. (HAL). Current PCSs include residential areas. This DWSP addresses the following sections: The Delineation Report; Prioritized PCS Inventory; Assessment of Hazards; Management Program for Existing and Future PCSs; Implementation Schedule; Resource Evaluation; Record Keeping Section; Contingency Plan; Public Notification; and Waivers.

CHAPTER 1 - INTRODUCTION

Hansen, Allen & Luce, Inc. (HAL) was retained by Skyline Mountain Resort Special Service District to prepare the Drinking Water Source Protection (DWSP) Plan 2016 Update for the Thads Peak Well. Source protection areas for the well have been delineated as defined in R309-600-9 (DDW, 2003).

This introduction addresses the water system information, source information, and designated person information. Subsequent chapters of this report address the Delineation Report, Inventory of PCSs, Management Program for Existing and Future PCSs, Implementation Schedule, Resource Evaluation, Record Keeping, Contingency Plan, Public Notification, and Waivers.

SYSTEM INFORMATION

Skyline Mountain Special Service District
2201 Skyline Mountain Resort
Fairview, UT 84629
System Number: 20043

SOURCE INFORMATION

The Thads Peak Well is located approximately N 587 ft. W 348 ft. from E4 cor., Sec 09, T 14S, R 5E, Salt Lake Base and Meridian.

DESIGNATED PERSON

Mr. Jeremy Fox
Water System Operator
22130 North 11750 East
Fairview, UT
(435) 469-1661

CHAPTER 2 – DELINEATION REPORT

No changes have been made to the well construction, pumping station, or operations of the Thads Peak Well that would alter the delineation of DWSP zones since the previous DWSP update was submitted to the Division of Drinking Water. However, based on a site visit to the well and updated aerial photography of the area, it was discovered that the location assumed in the previous DWSP Plan was about 1,000 feet southeast of the actual location of the well. Based on the previous delineation report by LASR Geo Consulting (2004), there is a fault near the well that acts as a barrier to groundwater flow. The location of the fault is shown on Figure 3-1. Because the actual location of the well is further from the fault than assumed in the original delineation, the shape of the DWSP zones is different than the original delineation even when using the same hydrogeologic characteristics.

Therefore, the DWSP zones were re-delineated with the well in the correct location using the same hydrogeologic characteristics developed by LASR Geo Consulting (2004). Table 2-1 summarizes these characteristics. There are no changes to any of the components of the previous Delineation Report other than the location of the well and the shape of the DWSP zones based on the correct well location relative to the fault. The updated DWSP zones are shown on Figure 3-1.

Table 2-1
Aquifer Characteristics (from LASR Geo Consulting, 2004)

Aquifer Characteristic	Value
Transmissivity	831 ft^2/day
Hydraulic Conductivity	10.39 ft/day
Aquifer Thickness	80 ft
Gradient	0.01 ft/ft
Groundwater Flow Direction	North 36° E
Effective Porosity	25%

CHAPTER 3 – PCS INVENTORY

This chapter of the Drinking Water Source Protection Preliminary Evaluation Report addresses the process of inventorying the Potential Contamination Sources (PCSs) within each of the four source protection zones around the sources, hazard identification at each PCS, prioritization of the inventory and a map showing the locations of PCSs.

The requirements for development of the PCS inventory state that:

> *Each PWS shall list all potential contaminant 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. Additionally, each PWS shall identify each potential contamination source as to its location in zone one, two, three and/or four, or in a management area and plot it on the map required in R309-600-9(4)(a)(vi).*

IDENTIFICATION OF PCSs

The Potential Contaminant Source (PCS) Inventory includes identified sources of potential contaminants which are capable of adversely impacting the quality of groundwater tributary to a drinking water source. In a general sense, PCSs may include any business, group, or individual involved in the manufacture, disposal, transport, storage, or use of contaminants which could potentially degrade the quality of the groundwater resources. Although there is a tendency to associate groundwater contamination with large business or industry, significant PCSs are often associated with smaller entities (which may include gas stations, farm storage tanks, septic tanks, and agricultural areas).

Areas of the DWSP zones are located in Sanpete County southeast of Fairview. The zones include a residential area on septic systems. The basis for determining whether an activity constituted a PCS was based primarily upon guidelines provided by the Utah Department of Environmental Quality, Division of Drinking Water (DDW) entitled "Source Protection User's Guide" (DDW, 1998). Judgment was also applied in determining what would qualify as a PCS.

IDENTIFICATION OF HAZARDS AT EACH PCS

A survey was performed by Hansen, Allen & Luce, Inc. (HAL) personnel to identify PCSs and quantify potential hazards at each PCS. Chemical, biological or radiological hazards are identified at each PCS in order to plan effective management strategies for reducing the risks to groundwater. A summary of information gathered for each PCS is included in Appendix A.

PCS INVENTORY

PCSs identified during the survey are summarized in Table 3-1. This table includes an assigned PCS number, contact information, potential hazards, and contaminant quantities for each PCS.

Table 3-1
PCS Inventory

PCS No.	Name of Facility	Contact Information	Hazards	Quantities
DWSP Zone 1 (No PCSs Identified)				
DWSP Zone 2				
2-1	Residential Area	1 home	Household chemicals; Application of fertilizer, pesticide, herbicide; street/parking runoff; septic systems	<5 gal Household Hazardous Waste; <50 lbs/home fertilizer, pesticides, herbicides 250 gpd flow per septic system 300 lineal feet of residential street
DWSP Zone 3				
3-1	Residential Area	6 homes	See 2-1	See 2-1 1,500 lineal feet of residential street
DWSP Zone 4				
4-1	Residential Area	16 homes	See 2-1	See 2-1 5,000 lineal feet of residential street

PRIORITIZATION OF POTENTIAL CONTAMINATION SOURCES

Prioritization of PCSs is accomplished through a priority setting scheme similar to that used by the EPA, as set forth in "Managing Groundwater Contamination Sources in Wellhead Protection Areas: A Priority Setting Approach" by the EPA (USEPA 570/9-91-023). This approach is recommended in the "Drinking Water Source Protection Program" by the State Division of Drinking Water (1993). Using the EPA approach in its entirety was determined to be excessive for the scope and special circumstances of this study. However, the general theory of risk assessment used in the EPA approach is applicable for PCS prioritization.

The **prioritization approach** described in this chapter consists of a strategy where PCSs are prioritized by assessing the risk potential of each source. Risk potential is a function of the likelihood of contamination and the severity of the resulting contamination. These two factors are each divided into two sub-categories and are defined as follows:

1. LIKELIHOOD OF CONTAMINATION

a. **Source Containment** – This includes factors or conditions at the PCS that affect the likelihood of contaminants being released into the groundwater. This represents approximately 25% of the total risk.
b. **Time of Travel** – Time of travel is the time it takes for released contaminants to reach the drinking water source. This is primarily a function of distance from the source and represents approximately 25% of the total risk.

2. SEVERITY OF CONTAMINATION

a. **Quantity of Contaminants** – Larger quantities of contaminants increase the risk to the drinking water source. This represents 25% of the total risk.
b. **Health Risk of Contaminants** – Contaminants that present more severe health risks upon reaching the drinking water source pose a greater risk. This represents 25% of the total risk.

Each of the above factors is assigned points as shown in Table 3-2. Each PCS is evaluated and assigned a score for each sub-category. The total risk to the drinking water source from each PCS equals the sum of all the sub-category scores. PCSs are then prioritized from greater risk (higher risk score) to lesser risk (lower risk score).

Table 3-2
Contaminant Risk Evaluation

Likelihood of Contamination		
Source Containment	Located Indoors =	0
	Outdoors, Above Ground =	5
	Outdoors, Below Ground =	10
	Inadequate Storage =	15
	If PCS is adequately controlled, subtract 5 from the Source Containment Score	
Time of Travel	15-year Zone, far =	3
	15-year Zone, near =	5
	3-year Zone, far =	7
	3-year Zone, near =	9
	250-day Zone, far =	11
	250-day Zone, near =	13
	Within Zone 1 =	15
Severity of Potential Contamination		
Quantity	<55 gallons =	1
	56-100 gallons =	3
	101-500 gallons =	6
	501-1,000 gallons =	9
	1,001-10,000 gallons =	12
	>10,000 gallons =	15

Health Risk	Low =	5
	Medium =	10
	High =	15

PRIORITIZATION RESULTS

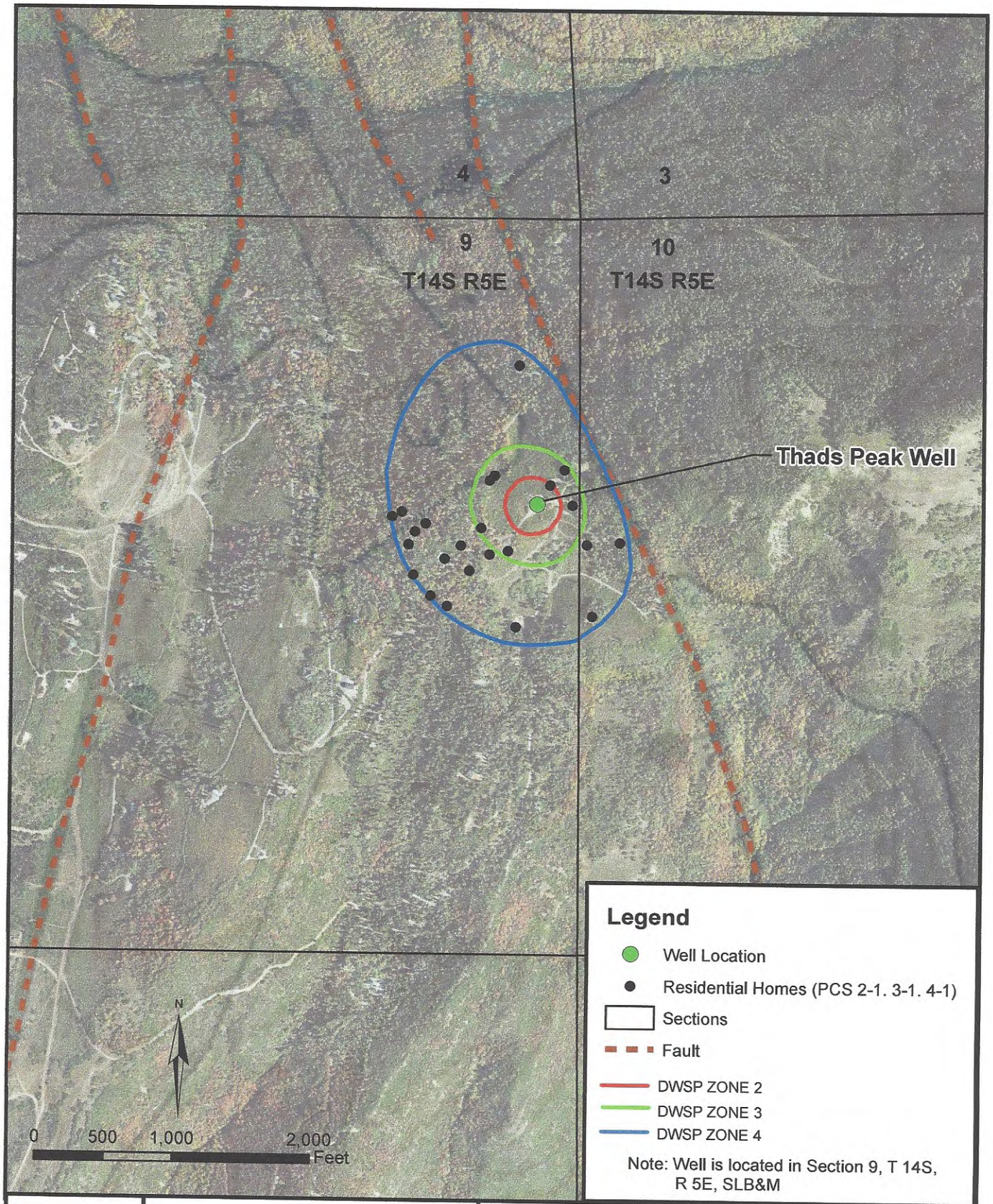
The contaminant risk evaluation was applied to each PCS identified in Table 3-1. The numerical summation of all the risk factors was completed and the resulting sum sorted according to decreasing numerical risk ranking. PCSs that are located in multiple zones were prioritized based on the closest proximity to the drinking water source. The results of the contaminant risk evaluation are summarized in Table 3-3. The complete prioritization procedure is included in Appendix A.

Table 3-3
PCS Priority Ranking

Priority	PCS No.	PCS Name	Risk Score
1	2-1	Residential Area	39
2	3-1	Residential Area	38
3	4-1	Residential Area	34

POTENTIAL CONTAMINATION SOURCE LOCATION MAP

The well location, delineated protection zones, and the locations of the identified PCSs within the source protection zones are shown on Figure 3-1. The numerical designation of the PCSs on Figure 3-1 corresponds with the assigned PCS number as shown in Table 3-1.



HANSEN ALLEN & LUCE INC ENGINEERS	SKYLINE MOUNTAIN SSD THADS PEAK WELL DWSP	POTENTIAL CONTAMINATION SOURCE INVENTORY	Figure 3-1

CHAPTER 4 – ASSESSMENT OF PCS HAZARDS

There are four types of hazard controls identified by the Division of Drinking Water (DDW), including Regulatory Controls, Best Management Practices, Physical Controls, and Negligible Quantity Controls. The hazards identified in Table 3-1 are each assessed as adequately controlled or inadequately controlled based on one of the four types of hazard controls just listed. PCS hazards assessed as adequately controlled require no further planning or implementation of land management strategies. The DWSP Rule (R309-600-10(2)(a) through (d)) outlines the procedure for assessing a PCS as adequately controlled. Table 4-1 includes a description of the procedure for assessing each type of control.

Table 4-1
Hazard Control Descriptions and Assessment Procedure

Control Type	Description	Procedure
Regulatory Controls	Regulatory Controls are codes, ordinances, rules, and regulations which regulate a PCS hazard.	1. Identify the enforcement agency. 2. Cite and/or quote applicable references in the regulation, rule or ordinance which pertain to controlling the hazard. 3. Explain how the regulatory controls affect the potential for ground water contamination. 4. Verify that the hazard is being regulated by the enforcement agency. 5. Assess the hazard as "Adequately Controlled" or "Not Adequately Controlled" and set a date to reassess the hazard if "Adequately Controlled."
Best Management Practices (BMPs)	BMPs include practices and procedures currently being used by the PCS to control a PCS hazard.	1. List the specific BMPs which have been implemented by the PCS management to control the hazard. 2. Indicate that the PCS is willing to continue the use of these BMPs. 3. Explain how these BMPs affect the potential for ground water contamination. 4. Assess the hazard as "Adequately Controlled" or "Not Adequately Controlled" and set a date to reassess the hazard if Adequately Controlled.
Physical Controls	Physical Controls are man-made structures and impoundments which prevent a hazard from entering the drinking water source.	1. Describe the physical control(s) which have been constructed to control the hazard. 2. Explain how these controls affect the potential for contamination. 3. Assess the hazard as "Adequately Controlled" or "Not Adequately Controlled" and set a date to reassess the hazard if Adequately Controlled.
Negligible Quantity Controls	Negligible Quantity Controls relate to the amount or toxicity of a hazard that is used by a PCS. The control deals with the risk of contamination and determining whether that risk is negligible or not significant enough to warrant further management.	1. Identify the quantity of the hazard that is being used, disposed, stored, manufactured, and/or transported. 2. Explain why this amount is a negligible quantity. 3. Assess the hazard as "Adequately Controlled" or "Not Adequately Controlled" and set a date to reassess the hazard if Adequately Controlled.

HAZARD ASSESSMENT

Table 4-2 includes the hazard assessment for each PCS and its hazards. Reassessment dates are only listed for those PCSs where an applied control is assessed as adequately controlled.

Table 4-2
Assessment of PCS Hazards

Priority Rank	PCS Name & No.	Applied Control	Description of Control*	Assessment Status	Reassessment Date
1,2,3	Residential Area (2-1, 3-1, 4-1)	Negligible Quantities (household chemicals)	1. <5 gallons/home of household chemicals 2. Chemicals are stored in smaller individual containers that if spilled would be absorbed onto soil particles and not reach groundwater. Combined amounts from 23 homes may not be negligible.	Inadequately Controlled	NA
		Best Management Practices (fertilizer, pesticides, herbicides)	1. Unknown if BMPs are followed when applying fertilizers, pesticides, herbicides 2. Unknown 3. Unknown	Inadequately Controlled	NA
		Regulatory (septic system)	1. No controls will prevent contamination from septic systems	Inadequately Controlled	NA
		Negligible Quantities (street runoff)	1. The local roads receive minimal local residential traffic and are not trucking routes. Residue left on the streets from traffic is very low. 2. Any contaminants mixed in storm runoff would be very diluted and be retained in the first several feet of topsoil.	Adequately Controlled	2021

* Numbered items in the Description of Control column correspond to the respective requirements for assessing a PCS as adequately controlled using Regulatory, Best Management Practice, Physical, and Negligible Quantity Controls as shown in Table 4-1 and as outlined in R309-600-10(2)(a) through (d).

NA = not applicable.

CHAPTER 5 – MANAGEMENT PROGRAM FOR EXISTING PCSs

This chapter describes the strategies for managing existing potential contamination sources (PCSs) within the source protection zones. The intent of these strategies, which are mostly educationally focused, is to encourage best management practices for existing PCSs.

MANAGEMENT STRATEGIES FOR EXISTING PCSs

Skyline Mountain Special Service District intends to pursue a public education program for managing existing PCSs. A list of land management strategies that the District will implement is presented in Table 5-1.

Table 5-1
Listing of Management Strategies

Strategy Code	Management Strategy
A	Inform the PCS that they are within a DWSP zone
B	Request homeowners and resort owner to implement Best Management Practices for household hazardous waste (household chemicals) and septic systems. (See Appendix C)
C	Request that all herbicides, pesticides, and fertilizers be applied according to manufacturer specifications.

One or more of the management strategies identified in Table 5-1 will be implemented for each inadequately controlled PCS within the source protection zones. Table 5-2 identifies which management strategies will be applied to each inadequately controlled PCS. The strategies chosen for each PCS were based on the hazards present at the PCS.

Table 5-2
Management Strategies for Existing PCSs

Priority Ranking	PCS Name and No.	Contaminant Source	Management Strategies to be Implemented*		
1,2,3	Residential Area (2-1, 3-1, 4-1)	Septic system, incidental chemical use in residential areas	A	B	C

*Letters in the "Management Strategies to be Implemented" column correspond to the Strategy Code identified in Table 5-1.

CHAPTER 6 – MANAGEMENT PROGRAM FOR FUTURE PCSs

Future potential contamination sources are property owners, business and other activities that do not yet exist within the DWSP zones but have a potential of locating within this area under existing social, economic and zoning conditions. This management program identifies strategies to protect the groundwater from potential future PCSs.

The management plan for future PCSs shall include the following procedure.

1. Update the PCS inventory periodically with new PCSs that have moved into the DWSP zones.
2. Identify the hazards of new PCSs and include them in the prioritized inventory.
3. Assess hazard controls at new PCSs.
4. Plan land management strategies for new PCSs as necessary and implement the same strategies listed for the management program for existing PCSs.

CHAPTER 7 – IMPLEMENTATION SCHEDULE

The Implementation Schedule included in Table 7-1 outlines the time frame which the District will implement the land management strategies which were addressed in Chapters 5 and 6.

Table 7-1
Land Management Strategies Implementation Schedule

Land Management Strategy	Code*	Implementation Date
Inform the PCS that they are within a DWSP zone	A	2016
Request homeowners to implement Best Management Practices for household hazardous waste (household chemicals) and septic systems. (See Appendix C)	B	2016
Request that all herbicides, pesticides, and fertilizers according to manufacturer specifications.	C	2016
DWSP Management Plan for future PCSs.	NA	Effective upon DDW approval of the DWSP Plan

NA = not applicable
* Corresponds to Strategy Code as defined in Table 5-1.

CHAPTER 8 – RESOURCE EVALUATION

According to the DWSP Rule, each public water system must assess the financial and other resources which may be required to implement a DWSP Plan and determine how these resources may be acquired.

FINANCIAL RESOURCES

Skyline Mountain Special Service District provides water to residents and businesses in the area, and administers all water system improvement programs. The District collects fees from the connections within the service area which cover the cost of providing culinary water. These resources have been adequate to meet the expenses of the water system. It is believed that this DWSP Plan can be implemented without significant cost to the District, and that available financial resources will be adequate.

HUMAN RESOURCES

The DWSP Plan will be administered by District personnel. Implementation of the DWSP Plan will not require extensive human resources. It is believed that implementation of the DWSP Plan may be accomplished by existing staff.

CHAPTER 9 – RECORD KEEPING SECTION

The Record Keeping portion of the DWSP Plan will be updated by the District as steps are taken to implement the items covered in this DWSP Plan. Examples to changes could include:

- The identification of new potential sources of groundwater contamination that were either not identified earlier or are new to the area;
- Changes in management practices at existing potential contamination sources;
- The acquisition of new information which significantly affects the assessment of controls of a potential source of groundwater contamination;
- Implementation of public education programs, letters and other correspondence about preventing groundwater contamination.

The plan will be updated as changes occur.

DOCUMENTATION OF PLAN IMPLEMENTATION

Table 9-1 is included for documentation of the implementation of this Drinking Water Source Protection Plan. This table identifies completed tasks and will continue to be updated as the Plan is implemented.

Table 9-1
Documentation of DWSP Plan Implementation

Date	Description of Completed Task
March 2005	Delineated DWSP Zones for the Thads Peak Well, updated PCS inventory, Hazard Assessment, Management programs for existing and future PCSs, Implementation schedule, resource evaluation, documentation, public notification, and waivers. DWSP Plan was prepared and submitted to the Division of Drinking Water.
Annually	Include DWSP information in the Water Quality Report sent to customers
June 2016	The Thads Peak Well Drinking Water Source Protection Plan report was updated. The PCS Inventory, hazard assessment, management program for existing and future PCSs and other sections of the DWSP Plan were updated.

CHAPTER 10 – CONTINGENCY PLAN

The Contingency Plan is to consist of an Emergency Response Plan, a Rationing Plan, a Water Decontamination Plan, and Source Development Plan. A Contingency Plan for Skyline Mountain Special Services District has previously been submitted and accepted by the State. This Plan includes all four areas as required in the State of Utah Administrative Code R309-600-14.

CHAPTER 11 – PUBLIC NOTIFICATION

Public water systems must notify the public that their DWSP Plans are available for review in accordance with R309-600-15(1). Skyline Mountain Special Service District will notify its customers of the general conclusions of their DWSP Plan. This will be included in an annual Water Quality Report published and distributed by the District and will include the following general information:

> The Drinking Water Source Protection Plan for Skyline Mountain Special Service District 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 generally residential land uses. Our drinking water sources have a medium susceptibility to potential contamination due to the location of residential homes with septic systems in the vicinity of the sources. We have also developed management strategies to further protect our sources from contamination. Please contact us at (801) 597-6798, if you have questions or concerns about our source protection plan.
>
> We stress that you use chemicals according to directions and dispose of pollutants or hazardous chemicals properly. Improper disposal can seriously impact drinking water and is illegal under state and federal law. We also encourage proper maintenance of septic systems to help protect the groundwater from the effects of failed disposal systems.

CHAPTER 12 – WAIVERS

Monitoring waivers have been established by the Division of Drinking Water to potentially save PWSs from significant water quality analysis costs, where risks of contamination of groundwater sources by certain chemical parameter groups are deemed to be low, and for PWSs which meet the established waiver guidelines.

The three types of monitoring waivers available to PWSs are:

- Reliably and Consistently;
- Use, and;
- Susceptibility.

The criteria for establishing a Reliably and Consistently Waiver is not affiliated with Drinking Water Source Protection Plans, and therefore will not be addressed in this Plan. However, the Use and Susceptibility Waivers are required to be addressed in this DWSP Plan for consideration by the Division of Drinking Water. Any Use and/or Susceptibility Waivers in existence prior to the deadline for DWSP Plan submittal, which have not been addressed in a DWSP Plan for the PWS and its sources, expire at the deadline.

USE WAIVER

If the chemicals within the VOC and/or pesticide parameter groups have not been used within the past five years within zones one, two and three, the source may be eligible for a Use Waiver. The requirements for a Use Waiver, as established by DDW are:

1. List the chemicals which are used, disposed, stored, transported, and manufactured at each potential contamination source within zones 1, 2, and 3 where the use of the chemicals within the VOC and pesticide parameter groups are likely: and
2. Submit a dated statement which is signed by the system's designated person that none of the VOCs and pesticides within these respective parameter groups have been used, disposed, stored, transported, or manufactured within the past five years within zones one, two, and three.

Due to the presence of residential areas within DWSP zone three, VOCs and pesticides have been used within the past 5 years within these zones. Therefore, the Thads Peak Well does not qualify for a Use Waiver.

SUSCEPTIBILITY WAIVER

A source which does not qualify for a Use Waiver, may be eligible for a Susceptibility Waiver. A Susceptibility Waiver is based upon evidence that a groundwater source is not susceptible to contamination from chemicals which exist in zones one, two and three. The requirements for a Susceptibility Waiver, as established by DDW are:

- 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 five years. A non-detectable analysis for each chemical within the parameter group(s) is required.

- Submit a dated statement which is signed by the system's designated person verifying that the PWS is confident that a susceptibility waiver for the VOC and/or pesticide parameter groups will not threaten public health; and
- Verify that the source is developed in a protected aquifer, as defined in R309-600-6(1)(v), and have a public education program which addresses proper use and disposal practices for pesticides and VOCs as in the management sections of the DWSP Plan.

Because the well does not qualify for protected aquifer classification, it is not eligible for a susceptibility waiver.

REFERENCES

Division of Drinking Water (DDW). 2003. *Drinking Water Source Protection Rule - Effective July 26, 1993 - Revised October 29, 2003.* State of Utah, Department of Environmental Quality. Salt Lake City, Utah.

Division of Drinking Water (DDW). 1998. *Source Protection User's Guide*. State of Utah, Department of Environmental Quality. Salt Lake City, Utah.

Division of Drinking Water (DDW). 1995. *Source Protection Workbook*. State of Utah, Department of Environmental Quality. Salt Lake City, Utah.

Environmental Protection Agency (EPA). 1991. *Managing Ground Water Contamination Sources in Wellhead Protection Areas: A Priority Setting Approach*. EPA 570/9-91-023. U.S. Environmental Protection Agency, Office of Water. Washington, D.C.

LASR Geo Consulting. 2004. *Skyline Mountain Resort Drinking Water Source Protection Plan for the Thades Peak Well. Castle Dale, Utah.*

APPENDIX A

PCS Summary and Prioritization

Skyline Mountain Special Service District			PCS Information Summary					
Thads Peak Well								
Ranking	PCS #	PCS Name	Description	Contact Info	Address	Phone	Contaminants	Quantity
1	2-1	Residential Area (1 home)	Residential homes with septic systems, household wastes, and street runoff from residential streets	Individual residents within the Skyline Mountain Subdivision	Southeast of Fairview, Utah	N/A	Household chemicals; application of fertilizers, pesticides, herbicides; septic system; street runoff	<5 gal/home h chemicals; <5 fertilizers, pest herbicides; ~2 septic effluent
2	3-1	Residential Area (6 homes)	Residential homes with septic systems, household wastes, and street runoff from residential streets	Individual residents within the Skyline Mountain Subdivision	Southeast of Fairview, Utah	N/A	Household chemicals; application of fertilizers, pesticides, herbicides; septic system; street runoff	<5 gal/home h chemicals; <5 fertilizers, pest herbicides; ~2 septic effluent
3	4-1	Residential Area (16 homes)	Residential homes with septic systems, household wastes, and street runoff from residential streets	Individual residents within the Skyline Mountain Subdivision	Southeast of Fairview, Utah	N/A	Household chemicals; application of fertilizers, pesticides, herbicides; septic system; street runoff	<5 gal/home h chemicals; <5 fertilizers, pest herbicides; ~2 septic effluent

Skyline Mountain Special Service District			PCS Contaminant Risk Evaluation								
Thads Peak Well			Source Containment		Time of Travel	Quantity	Health Risk	SOURCE CONTAINMENT		DIST	Sc
			Location	Adequately Controlled	Distance			Location	Adeq. Cont.		
Ranking	PCS #	PCS Name	(I/OA/OB/IS)	(y/n)	(zone n/f)	gal	(h/m/l)				
1	2-1	Residential Area (1 home)	OB	n	2n	250	m	10	0	13	
2	3-1	Residential Area (6 homes)	OB	n	3n	1,500	m	10	0	9	
3	4-1	Residential Area (16 homes)	OB	n	4n	4,000	m	10	0	5	

APPENDIX B

Best Management Practices for Managing PCSs

Partnership for the Environment

Utah Department of Environmental Quality

Septic Tank/Drainfield System 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 drainfield and into the ground water.

How Does A Septic Tank/Drainfield System Work?

The basic septic system is composed of a septic tank followed by a drainfield. 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 drainfield.

Wastewater treatment is restricted to a rather thin zone of unsaturated soil underlying the drainfield. 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 drainfield.

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 drainfield 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 drainfield of your septic system.

- Keep the soil over the drainfield covered with grass to prevent soil erosion.
- Don't drive vehicles over the system.
- Don't cover the tank or drainfield 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, egg shells, 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 drainfield. Problems caused by using too much water can occur periodically throughout the year or be seasonal. For example, the soil beneath your drainfield 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 drainfield 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 drainfield. If this happens, pump the tank will not solve the problem and a new drainfield will probably need to be constructed on a different part of the lot.

For More Information, Contact:

Division of Drinking Water, Source Protection Program - (801) 536-4200
Division of Water Quality - (801) 538-6146
Sonja Wallace, Pollution Prevention Coordinator - (801) 536-4477
Environmental Hotline - 1-800-458-0145

Partnership for the Environment

Utah Department of Environmental Quality

Household Hazardous Waste Fact Sheet

What is Household Hazardous Waste?

Many hazardous products and chemicals such as cleaners, oils and pesticides are used in the home every day. When 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 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

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

2. After you buy:

- Read label precautions and follow directions for safe use.
- Recycle/dispose of empty containers 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, Contact:

Division of Solid & Hazardous Waste - (801) 538 - 6170
Division of Drinking Water, Source Protection Program - (801) 536-4200
Environmental Hotline - 1-800-458-0145
Sonja Wallace, Pollution Prevention Coordinator - (801) 536-4477

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Utah Department of Environmental Quality

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 fertilizer with combustibles, such as gasoline or kerosine, because of explosion hazards.

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. The following chart indicates how much of various fertilizer will supply one pound of nitrogen."

%N on Label	Pounds of Fertilizer Per 1000 Square Feet
12-15	7-8
18-21	5-5 ½
24-28	3 ½-4
30-34	3-3½
45-46	2-2 ¼

Types of Plants

One of the best ways to protect your ground water 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 ground water.

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
Department of Agriculture - (801) 538-7100
Environmental Hotline - 1-800-458-0145
Sonja Wallace, Pollution Prevention Coordinator - (801) 536-4477

Partnership for the Environment

Utah Department of Environmental Quality

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:
    1. 10% of the total volume of the containers, or
    2. 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:
    1. Measure the total square feet you intend to treat.
    2. 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.)
    3. 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, Contact:

Division of Drinking Water, Source Protection Program - (801) 536-4200
Department of Agriculture - (801) 538-7100
Environmental Hotline - 1-800-458-0145
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