Source Water Protection Plan
Wilderness Public Service District

PWSID WV3303405

Nicholas County

May 2016

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In cooperation with Wilderness PSD

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I certify the information in the source water protection plan is complete and accurate to the best of my knowledge.

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Print Name of Authorizing Signatory:

Chief operator

Title of Authorizing Signatory:

5/13/2016

Date of Submission:

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SOURCE WATER PROGRAM ACRONYMS

AST	Aboveground Storage Tank
BMP	Best Management Practices
ERP	Emergency Response Plan
GWUDI	Ground Water Under the Direct Influence of Surface Water
LEPC	Local Emergency Planning Committee
OEHS/EED	Office of Environmental Health Services/Environmental Engineering Division
PE	Professional Engineer
PSSCs	Potential Source of Significant Contamination
PWSU	Public Water System Utility
RAIN	River Alert Information Network
RPDC	Regional Planning and Development Council
SDWA	Safe Drinking Water Act
SWAP	Source Water Assessment and Protection
SWAPP	Source Water Assessment and Protection Program
SWP	Source Water Protection
SWPA	Source Water Protection Area
SWPP	Source Water Protection Plan
WARN	Water/Wastewater Agency Response Network
WHPA	Wellhead Protection Area
WHPP	Wellhead Protection Program
WSDA	Watershed Delineation Area
WVBPH	West Virginia Bureau for Public Health
WVDEP	West Virginia Department of Environmental Protection
WVDHHR	West Virginia Department of Health and Human Resources
WVDHSEM	West Virginia Division of Homeland Security and Emergency Management
ZCC	Zone of Critical Concern
ZPC	Zone of Peripheral Concern

1.0 PURPOSE

The goal of the West Virginia Bureau of Public Health (WVBPH) source water assessment and protection (SWAP) program is to prevent degradation of source waters which may preclude present and future uses of drinking water supplies to provide safe water in sufficient quantity to users. The most efficient way to accomplish this goal is to encourage and oversee source water protection on a local level. Many aspects of source water protection may be best addressed by engaging local stakeholders.

The intent of this document is to describe what Wilderness Public Service District (PSD) has done, is currently doing, and plans to do to protect its source of drinking water. Although this water system treats the water to meet federal and state drinking water standards, conventional treatment does not fully eradicate all potential contaminants, and treatment that goes beyond conventional methods is often very expensive. By completing this plan, Wilderness PSD acknowledges that implementing measures to minimize and mitigate contamination can be a relatively economical way to help ensure the safety of the drinking water.

1.1 WHAT ARE THE BENEFITS OF PREPARING A SOURCE WATER PROTECTION PLAN?

- Fulfilling the requirement for the public water utilities to complete or update their source water protection plan.
- Identifying and prioritizing potential threats to the source of drinking water; and establishing strategies to minimize the threats.
- Planning for emergency response to incidents that compromise the water supply by contamination or depletion, including how the public, state, and local agencies will be informed.
- Planning for future expansion and development, including establishing secondary sources of water.
- Ensuring conditions to provide the safest and highest quality drinking water to customers at the lowest possible cost.
- Providing more opportunities for funding to improve infrastructure, purchase land in the protection area, and other improvements to the intake or source water protection areas.

2.0 BACKGROUND: WV SOURCE WATER ASSESSMENT AND PROTECTION PROGRAM

Since 1974, the federal Safe Drinking Water Act (SDWA) has set minimum standards on the construction, operation, and quality of water provided by public water systems. In 1986, Congress amended the SDWA. A portion of those amendments were designed to protect the source water contribution areas around ground water supply wells. This program eventually became known as the Wellhead Protection Program (WHPP). The purpose of the WHPP is to prevent pollution of the source water supplying the wells.

The Safe Drinking Water Act Amendments of 1996 expanded the concept of wellhead protection to include surface water sources under the umbrella term of Source Water Protection. The amendments encourage states to establish SWAP programs to protect all public drinking water supplies. As part of this initiative states must explain how protection areas for each public water system will be delineated, how potential contaminant sources will be inventoried, and how susceptibility ratings will be established.

In 1999, the WVBPH published the West Virginia Source Water Assessment and Protection Program, which was endorsed by the United States Environmental Protection Agency. Over the next few years, WVBPH staff completed an assessment (i.e., delineation, inventory and susceptibility analysis) for all of West Virginia's public water systems. Each public water system was sent a copy of its assessment report. Information regarding assessment reports for Wilderness PSD can be found in **Table 1**.

3.0 STATE REGULATORY REQUIREMENTS

On June 6, 2014, §16 1 2 and §16 1 9a of the Code of West Virginia, 1931,was reenacted and amended by adding three new sections, designated §16 1 9c, §16 1 9d and §16-1-9e. The changes to the code outlines specific requirements for public water utilities that draw water from a surface water source or a surface water influenced groundwater source.

Under the amended and new codes each existing public water utility using surface water or ground water influenced by surface water as a source must have completed or updated a source water protection plan by July 1, 2016, and must continue to update their plan every three years. Existing source water protection plans have been developed for many public water utilities in the past. If available, these plans were reviewed and considered in the development of this updated plan. Any new water system established after July 1, 2016 must submit a source water protection plan before they start to operate. A new plan is also required when there is a significant change in the potential sources of significant contamination (PSSC) within the zone of critical concern (ZCC).

The code also requires that public water utilities include details regarding PSSCs, protection measures, system capacities, contingency plans, and communication plans. Before a plan can be approved, the local health department and public will be invited to contribute information for consideration. In some instances, public water utilities may be asked to conduct independent studies of the source water protection area and specific threats to gain additional information.

4.0 SYSTEM INFORMATION

Wilderness PSD is classified as a state regulated public utility and operates a community public water system. A community public water system is a system that regularly supplies drinking water from its own sources to at least 15 service connections used by year round residents of the area or regularly serves 25 or more people throughout the entire year. For purposes of this source water protection plan, community public water systems are also referred to as public water utilities. Information on the population served by this utility is presented in **Table 1** below.

Table 1. Population Served by Wilderness PSD

Administrative office location:	589 Riviera Road, Mount Nebo, WV 26679		
Is the system a public utility, according to the Public Service Commission rule?	Yes		
Date of Most Recent Source Water Assessment Report:	December 2002		
Date of Most Recent Source Water Protection Plan:	August 2011		
Population served directly:	Wilderness PSD serves an estimated population of 5,137 people. (2,055 customers, according to 2015 PSC Annual Report, multiplied by 2.5 people per utility connection)		
Bulk Water Purchaser Systems:	**System Name**	**PWSID Number**	**Population**
	None	N/A	N/A
Total Population Served by the Utility:	The utility serves a total population of 5,137 people.		
Does the utility have multiple source water protection areas (SWPAs)?	Yes		
How many SWPAs does the utility have?	2		

5.0 WATER TREATMENT AND STORAGE

As required, Wilderness PSD has assessed their system (e.g., treatment capacity, storage capacity, unaccounted for water, contingency plans) to evaluate their ability to provide drinking water and protect public health. **Table 2** contains information on the water treatment methods and capacity of the utility. Information about the surface sources from which Wilderness PSD draws water can be found in **Table 3**. If the utility draws water from any groundwater sources to blend with the surface water the information about these ground water sources can be found in **Table 4**.

Table 2. Wilderness PSD Water Treatment Information

Water Treatment Processes (List All Processes in Order)	Water treatment processes include prechlorination, coagulation, flocculation, sedimentation, filtration, chlorination, and fluoridation.
Current Treatment Capacity (gal/day)	The current treatment capacity of the treatment plant is around 504,000 gallons/day.
Current Average Production (gal/day)	On average, the treatment plant produces around 299,000 gallons/day.
Maximum Quantity Treated and Produced (gal)	The maximum quantity of water produced in the last year was 475,000 gallons on 6/25/2015(1).
Minimum Quantity Treated and Produced (gal)	The minimum produced in the last year was 232,000 gallons on 2/20/2015(1).
Average Hours of Operation	The plant is staffed and operated an average of 16 to 18 hours a day.
Maximum Hours of Operation in One Day	The maximum hours of operation in a single day in the last year was 24 hours on 6/25/2015(2).
Minimum Hours of Operation in One Day	The minimum hours of operation in a single day in the last year was 12.1 hours on 2/20/2015(2).
Number of Storage Tanks Maintained	The water system maintains 7 treated water storage tanks and 3 booster pump stations.
Total Gallons of Treated Water Storage (gal)	The system has a total treated water storage capacity of 807,000 gallons.
Total Gallons of Raw Water Storage (gal)	The water system does not have any raw water storage capacity.

(1) Information from the 2015 Public Service Commission (PSC) Annual Report for Wilderness PSD.

(2) Maximum gallons produced divided by a production rate of roughly 320 GPM.

Table 3. Wilderness PSD Surface Water Sources

Intake Name	SDWIS #	Local Name	Describe Intake	Name of Water Source	Date Constructed/ Modified	Frequency of Use (Primary/ Backup/ Emergency)	Activity Status (Active/ Inactive)
Anglins Creek Intake	IN001	Anglins Creek Intake	Gravity fed screened intake	Anglins Creek	1979	Primary	Active
Meadow River Intake	IN002	Meadow River Intake	Gravity fed screened intake	Meadow River	1979	Primary	Active

Table 4. Wilderness PSD Groundwater Sources

Does the utility blend with groundwater?					No				
Well/Spring Name	SDWIS #	Local Name	Date Constructed/Modified	Completion Report Available (Yes/No)	Well Depth (ft.)	Casing Depth (ft.)	Grout (Yes/No)	Frequency of Use (Primary/ Backup/ Emergency)	Activity Status (Active/ Inactive)
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

6.0 DELINEATIONS

For surface water systems, delineation is the process used to identify and map the drainage basin that supplies water to a surface water intake. This area is generally referred to as the source water protection area (SWPA). All surface waters are susceptible to contamination because they are exposed at the surface and lack a protective barrier from contamination. Accidental spills, releases, sudden precipitation events that result in overland runoff, or storm sewer discharges can allow pollutants to readily enter the source water and potentially contaminate the drinking water at the intake. The SWPA for surface water is distinguished as a Watershed Delineation Area (WSDA) for planning purposes; and the Zone of Peripheral Concern (ZPC) and Zone of Critical Concern (ZCC) are defined for regulatory purposes.

The WSDA includes the entire watershed area upstream of the intake to the boundary of the State of West Virginia border or a topographic boundary. The ZCC for a public surface water supply is a corridor along streams within the watershed that warrants more detailed scrutiny due to its proximity to the surface water intake and the intake's susceptibility to potential contaminants within that corridor. The ZCC is determined using a mathematical model that accounts for stream flows, gradient and area topography. The length of the ZCC is based on a five-hour time-of-travel of water in the streams to the water intake, plus an additional one-quarter mile below the water intake. Ohio River ZCC delineations are based on ORSANCO guidance and extend 25 miles above the intake. The width of the zone of critical concern is 1,000 feet measured horizontally from each bank of the principal stream and five hundred feet measured horizontally from each bank of the tributaries draining into the principal stream. Ohio River ZCC delineations are based on ORSANCO guidance and extend 25 miles above the intake and one-quarter mile below the intake. The Ohio River ZCC delineations include 1,320 feet (one-quarter mile) measured from the bank of the main stem of the Ohio River and 500 feet on tributary.

The ZPC for a public surface water supply source and for a public surface water influenced groundwater supply source is a corridor along streams within a watershed that warrants scrutiny due to its proximity to the surface water intake and the intake's susceptibility to potential contaminants within that corridor. The ZPC is determined using a mathematical model that accounts for stream flows, gradient and area topography. The length of the zone of peripheral concern is based on an additional five-hour time-of-travel of water in the streams beyond the perimeter of the zone of critical concern, which creates a protection zone of ten hours above the water intake. The width of the zone of peripheral concern is one thousand feet measured horizontally from each bank of the principal stream and five hundred feet measured horizontally from each bank of the tributaries draining into the principal stream.

For groundwater supplies there are two types of SWPA delineations: 1) wellhead delineations and 2) conjunctive delineations, which are developed for supplies identified as groundwater under the direct influence of surface water, or GWUDIs. A wellhead protection area is determined to be the area contributing to the recharge of the groundwater source (well or spring), within a five year time of travel. A conjunctive delineation combines a wellhead protection area for the hydrogeologic recharge and a connected surface area contributing to the wellhead.

Information and maps of the WSDA, ZCC, ZPC and Wellhead Protection Area for this public water supply were provided to the utility and are attached to this report. See **Appendix A. Figures**. Other information about the WSDA is shown in **Table 5**.

Table 5. Watershed Delineation Information

Size of WSDA (Indicate units)	The Watershed Delineation area for both the Meadow River and Anglins Creek covers approximately 354 square miles.
River Watershed Name (8-digit HUC)	Gauley River Watershed- 05050005
Size of Zone of Critical Concern (Acres)	The ZCC for the Meadow River intake covers about 18,777 acres and the ZCC for the Anglins Creek intake covers 8,301 acres.
Size of Zone of Peripheral Concern (Acres) (Include ZCC area)	The zone of peripheral concern for the Meadow River intake covers approximately 32,793 acres, and the ZPC for the Anglins Creek intake covers about 10,572 acres.
Method of Delineation for Groundwater Sources	N/A. The utility does not have any groundwater sources.
Area of Wellhead Protection Area (Acres)	N/A

7.0 PROTECTION TEAM

One important step in preparing a source water protection plan is to organize a source water protection team who will help develop and implement the plan. The legislative rule requires that water utilities make every effort to inform and engage the public, local government, local emergency planners, the local health department and affected residents at all levels of the development of the protection plan. WVBPH recommends that the water utility invite representatives from these organizations to join the protection team, which will ensure that they are given an opportunity to contribute in all aspects of source water protection plan development. Public water utilities should document their efforts to engage representatives and provide an explanation if any local stakeholder is unable to participate. In addition, other local stakeholders may be invited to participate on the team or contribute information to be considered. These individuals may be emergency response personnel, local decision makers, business and industry representatives, land owners (of land in the protection area), and additional concerned citizens.

The administrative contact for Wilderness PSD is responsible for assembling the protection team and ensuring that members are provided the opportunity to contribute to the development of the plan. The acting members of the Protection Team are listed in **Table 6.**

The role of the protection team members will be to contribute information to the development of the source water protection plan, review draft plans and make recommendations to ensure accuracy and completeness, and when possible contribute to implementation and maintenance of the protection plan. The protection team members are chosen as trusted representatives of the community served by the water utility and may be designated to access confidential data that contains details about the local PSSCs. The input of the protection team will be carefully considered by the water utility when making final decisions relative to the documentation and implementation of the source water protection plan.

Wilderness PSD will be responsible for updating the source water protection plan and rely upon input from the protection team and the public to better inform their decisions. To find out how you can become involved as a participant or contributor, visit the utility website or call the utility phone number, which are provided in **Table 6.**

Table 6. Protection Team Member and Contact Information

Name	Representing	Title	Phone Number	Email
John Scott Rader	Wilderness PSD	Chief Operator	304-872-5225	scott.wpsd@gmail.com
Debbie Gilbert	Wilderness PSD	Office Manager	304-872-1598	debbie.gilbert@wildernesspsd.com
Pat McCutcheon	Wilderness PSD	Field Supervisor	304-651-1599	water.wpsd@gmail.com
Todd Dean	Wilderness PSD Board	Member	[redacted]	todddean@eaglecarbon.com
Elizabeth Ratliff	Nicholas County Health Department	Sanitarian	304-872-5329	elizabeth.d.ratlifff@wv.gov
Rodney Boyce	Nicholas County Health Department	Director	304-872-5329	rodney.j.boyce@wv.gov
Director	Nicholas County Emergency Management	Director	304-872-7892	-
Chris Farrish	WV DHHR Environmental Engineering Division	District Engineer	304-575-8524	chris.b.farrish@wv.gov
Date of first protection Team Meeting		11/17/2015		
Efforts made to inform and engage local stakeholders (public, local government, local emergency planners, local health department, and affected residents) and explain absence of recommended stakeholders:	Scott Rader contacted the protection team members by phone and email and arranged the meeting at the Wilderness PSD office. All recommended members agreed to participate on the team but four members could not make the first meeting (Rodney Boyce, Elizabeth Ratliff, and Chris Farrish). They will included in all future planning efforts and will review the source water protection plan before it is submitted. At the time that the plan was developed, Mike Judy was the Director for Nicholas County Emergency Management, but he left the position shortly after the protection team meeting. His replacement, who had not been hired as of the plan submission date, will be included in future planning efforts. Chief Operator Scott Rader also took efforts to engage and inform the public during this process by posting information about source water protection on the utility webpage and around the PSD office. These efforts were intended to inform the public about the SWPP and their ability to review and comment on the plan. More information about these efforts are included in **Table 10. Education and Outreach Implementation Plan**.			

8.0 POTENTIAL SOURCES OF SIGNIFICANT CONTAMINATION

Source water protection plans should provide a complete and comprehensive list of the PSSCs contained within the ZCC based upon information obtained from the WVBPH, working in cooperation with the West Virginia Department of Environmental Protection (WVDEP) and the West Virginia Division of Homeland Security and Emergency Management (WVDHSEM). A facility or activity is listed as a PSSC if it has the potential to release a contaminant that could potentially impact a nearby public water supply, and it does not necessarily indicate that any release has occurred.

The list of PSSCs located in the SWPA is organized into two types: 1) SWAP PSSCs, and 2) Regulated Data. SWAP PSSCs are those that have been collected and verified by the WVBPH SWAP program during previous field investigations to form the source water assessment reports and source water protection plans. Regulated PSSCs are derived from federal and state regulated databases, and may include data from WVDEP, US Environmental Protection Agency, WVDHSEM, and out-of-state data sources.

8.1 CONFIDENTIALITY OF PSSCS

A list of the PSSCs contained within the ZCC should be included in the source water protection plan. However, the exact location, characteristics and approximate quantities of contaminants shall only be made known to one or more designees of the public water utility and maintained in a confidential manner. In the event of a chemical spill, release or other related emergency, information pertaining to the contaminant shall be immediately disseminated to any emergency responders reporting to the site. The designees for Wilderness PSD are identified in the communication planning section of the source water protection plan.

PSSC data from some agencies (ex. WVDHSEM, WVDEP, etc.) may be restricted due to the sensitive nature of the data. Locational data will be provided to the public water utility. However, to obtain specific details regarding contaminants, (such as information included in Tier II reports), water utilities should contact the local emergency planning commission (LEPC) or agencies, directly. While the maps and lists of the PSSCs and regulated sites are to be maintained in a confidential manner, these data are provided in **Appendix A. Figures** for internal review and planning uses only.

8.2 LOCAL AND REGIONAL PSSCS

For the purposes of this source water protection plan, local PSSCs are those that are identified by the water utility and local stakeholders and are not already identified in the PSSCs lists distributed by the WVBPH and other agencies. Local stakeholders may identify local PSSCs for two main reasons. The first is that it is possible that threats exist from unregulated sources and land uses that have not already been inventoried and do not appear in regulated databases. For this reason each public water utility should investigate their protection area for local PSSCs. A PSSC inventory should identify all contaminant sources and land uses in the delineated ZCC. The second reason local PSSCs are identified is because public water utilities may consider expanding the PSSC inventory effort outside of the ZCC into the ZPC and WSDA if necessary to properly identify all threats that could impact the drinking water source. As the utility considers threats in the watershed they may consider collaborating with upstream communities to identify and manage regional PSSCs.

When conducting local and regional PSSC inventories, utilities should consider that some sources may be obvious like above ground storage tanks, landfills, livestock confinement areas, highway or railroad right of ways, and sewage treatment facilities. Others are harder to locate like abandoned cesspools, underground tanks, French drains, dry wells, or old dumps and mines.

Wilderness PSD reviewed intake locations and the delineated SWPAs to verify the existence of PSSCs provided by the WVBPH and identify new PSSCs. If possible, locations of regulated sites within the SWPA were confirmed. Information on any new or updated PSSCs identified by Wilderness PSD and not already appearing in datasets from the WVBPH can be found in Table 7.

Table 7. Locally Identified Potential Sources of Significant Contamination

PSSC Number	Map Code	Site Name	Site Description	Relative Risk Score	Comments
81	A-20	Logging/Timbering	Timbering site in watershed	3.8	Stream buffers look to be established on aerial imagery
82	M-10	Unregulated Junkyard	There appears to be an unregulated junkyard or illegal dumping at this site.	6.4	-
83	A-2	Cattle Farm/Feedlot	Cattle with access to stream	4.2	No apparent stream buffers
84	M-7	Bridge	Bridge over Meadow River	6.2	-

8.3 PRIORITIZATION OF THREATS AND MANAGEMENT STRATEGIES

Once the utility has identified local concerns, they must develop a management plan that identifies specific activities that will be pursued by the public water utility in cooperation and concert with the WVBPH, local health departments, local emergency responders, LEPC and other agencies and organizations to protect the source water from contamination threats.

Depending on the number identified, it may not be feasible to develop management strategies for all of the PSSCs in the SWPA. The identified PSSCs can be prioritized by potential threat to water quality, proximity to the intake(s), and local concern. The highest priority PSSCs can be addressed first in the initial management plan. Lower ranked PSSCs can be addressed in the future as time and resources allow. To assess the threat to the source water, water systems should consider confidential information about each PSSC. This information may be obtained from state or local emergency planning agencies, Tier II reports, facility owner, facility groundwater protection plans, spill prevention response plans, results of field investigations, etc.

In addition to identifying and prioritizing PSSCs within the SWPA, local source water concerns may also focus on critical areas. For the purposes of this source water protection plan, a critical area is defined as an area that is identified by local stakeholders and can lie within or outside of the ZCC. Critical areas may contain one or more PSSCs which would require immediate response to address a potential incident that could impact the source water.

A list of priority PSSCs was selected and ranked by the Wilderness PSD Protection Team. This list reflects the concerns of this specific utility and may contain PSSCs not previously identified and not within the ZCC or ZPC. **Table 8** contains a description of why each critical area or PSSC is considered a threat and what management strategies the utility is either currently using or could use in the future to address each threat.

9.0 IMPLEMENTATION PLAN FOR MANAGEMENT STRATEGIES

Wilderness PSD reviewed the recommended strategies listed in their previous source water protection plan, to consider if any of them should be adopted and incorporated in this updated plan. **Table 9** provides a brief statement summarizing the status of the recommended strategies. **Table 9** also lists strategies from a previous plan that are being incorporated in this plan update

When considering source management strategies and education and outreach strategies, this utility has considered how and when the strategies will be implemented. The initial step in implementation is to establish responsible parties and timelines to implement the strategies. The water utility, working in conjunction with the Protection Team members, can determine the best process for completing activities within the projected time periods. Additional meetings may be needed during the initial effort to complete activities, after which the Protection Team should consider meeting annually to review and update the Source Water Protection Plan. A system of regular updates should be included in every implementation plan.

Proposed commitments and schedules may change but should be well documented and reported to the local stakeholders. If possible, utilities should include cost estimates for strategies to better plan for implementation and possible funding opportunities. Wilderness PSD has developed an implementation plan for priority concerns listed in **Table 8**. The responsible team member, timeline, and potential cost of each strategy are presented in **Table 9**. Note: Because timelines may change, future plan updates should describe the status of each strategy and explain the lack of progress. The responsible team member, timeline, and potential cost of each strategy was estimated and is presented in **Table 9**.

Table 8. Priority PSSCs or Critical Areas

PSSC or Critical Area	Priority Number	Reason for Concern
Waste Water Plant Sludge Land Application	1	In the past, the WVDEP permitted a sludge disposal site within the ZCC of Anglins Creek, the water system's secondary source. While the disposal would not necessarily pose an imminent threat if applied correctly, the potential for an accidental release of materials into the stream was a concern for Wilderness PSD. The chief operator believes the site does not currently have an updated permit but he is unsure whether it will be renewed in the future.
Logging/Timber Operations	2	The timber industry owns much of the property within the ZCC. Timbering activities can cause erosion and increase sediment in surface waters. Fuel and other fluids from vehicles and machinery can contaminate water resources if not properly contained or cleaned up.
Railroad/Highway	3	Given that the railway and highways parallel the surface water and cross the stream in several locations, accidental spills, rights-of-way maintenance, and other activities could result in contamination of the water source. Highway road salt use can also migrate into the water supply.

Table 9. Priority PSSC Management Strategies

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
Previous Plan Status	There were 7 management strategies recommended in the existing plan. 4 of these strategies have either been implemented or are no longer a concern. 3 of these are ongoing or continue to be a concern. These are incorporated in this plan update and listed below, in addition to the updated management strategies.	-	-	-	-

Waste Water Plant Sludge Land Application	Given the concern that waste water sludge could be released into the stream, the chief operator has contacted the WVDHHR and the WVDEP regarding the sludge application permit. In addition, he contacted the landowner and met with them to discuss the public concerns for the source water. The landowner agreed to cease application. The permit expired in recent years, but in the event that it is renewed the situation will continue to be monitored. The operator is unsure whether a renewal application has been submitted.	Utility Staff	Ongoing monitoring of site and communication with WVDEP	-	-
Logging/Timber Operations	Utility staff will communicate with logging companies and the WV Division of Forestry to ask for their consideration and provide them a map of the ZCC. Work with the logging company and property owners to plan/design/implement methods to control impacts to surface water	Utility Staff	As needed when there are new logging activities initiated in the watershed.	If needed contact the WV Division of Forestry, 1900 Kanawha Boulevard East, Charleston, WV 25305-0180, or at 304-558-2788 to communicate concerns arising from increased sedimentation. When appropriate, ask that they investigate active logging sites and educate the loggers of proper best management practices (BMPs) to prevent runoff into the streams. The WV Division of Forestry offers a BMP manual at the following link: http://www.wvforestry.com/BMP%20Book%202009.pdf	Minimal costs associated with staff time and mailings.
Railroad/Highway	Coordinate with emergency officials to be better prepared in the event of a hazardous spill. Contact the railroad companies and trucking companies to determine what types of materials are being transported through the area. Work with the companies to create an emergency response plan should any incident occur in order to prevent contamination of the source water. Access the commodity flow study that was completed by Nicholas County Emergency Services and familiarize utility staff with the types of hazardous materials that could impact	Utility Staff/ Emergency Personnel	By 2019 SWPP Update.	Chief Operator, Scott Rader, contacted the WVDOH to inquire about the herbicide used along the highway paralleling Meadow River. He was told at that time that the herbicide used is a “non-migrating” substance that will not impact the surface water. Communicate the boundaries of the SWPA to raise awareness to ensure BMPs with the herbicide and other substances used for maintenance.	Minimal costs associated with staff time.

	the source water and how often they are transported through the ZCC.				
Source Water Protection Plan	Update this Source Water Protection Plan at least every 3 years as required by the State Code of West Virginia.	Source Water Protection Team	Every 3 years. Next update in 2019	The Protection Plan should also be updated any time there is a significant change within the protection area or in utility staff. Yearly meetings of the protection team are recommended to ensure all members are up to date and informed about any developments within the protection area.	Minimal costs associated with team members' time
Future Development and Other Activities Within the Watershed	Water utility staff will perform a yearly "windshield survey" of the zone of critical concern. They will note changes in land use, water quality, and other developments that may have occurred since the previous year's survey. These changes will be documented and reflected in future source water protection plan updates.	Water utility staff	Yearly, next survey in 2017	Document the date of the survey and any changes that may have occurred within the ZCC that could impact water quality.	Minimal cost associated with staff time
Yearly Source Water Protection Team Meetings	The Protection Team for Wilderness PSD will meet on a yearly basis to discuss any changes that might have occurred within the watershed or to find replacements for members who can no longer participate on the team.	Source Water Protection Team	Yearly, next meeting in 2017	-	Minimal cost associated with staff time
Regular Coordination with Emergency Managers	Wilderness PSD staff have worked in the past with Nicholas County Emergency Management to respond to emergencies effectively and maintain water service to customers. Utility staff will continue to communicate with these emergency services groups on a regular basis, especially when there is not an ongoing emergency. They will meet yearly as part of the Source Water Protection Team.	Water utility staff and emergency response personnel	Yearly, during regular Protection Team Meetings	-	Minimal cost associated with staff time

10.0 EDUCATION AND OUTREACH STRATEGIES

The goal of education and outreach is to raise awareness of the need to protect drinking water supplies and build support for implementation strategies. Education and outreach activities will also ensure that affected citizens and other local stakeholders are kept informed and provided an opportunity to contribute to the development of the source water protection plan. Wilderness PSD has created an Education and Outreach plan that describes activities it has either already implemented or could implement in the future to keep the local community involved in protecting their source of drinking water. This information can be found in **Table 10**.

Table 10. Education and Outreach Implementation Plan

Education and Outreach Strategy	Description of Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
Public Outreach and Education Period	Wilderness PSD staff posted informational notices about the source water protection plan around the PSD office and on the utility webpage, as well as in the Nicholas Chronicle. The newspaper article ran for 2 weeks. These notices were intended to inform the public about their ability to review and provide comments on the plan. The flyer listed contact information for the PSD and the chief operator.	Utility Staff	From April 1, 2016 to April 22, 2016	The information flyer is attached in **Appendix E. Supporting Documentation**. The chief operator received a few requests to review the plan and he obliged. No significant comments or changes were suggested.	Minimal cost related to operator time
Consumer Confidence Report	The water system publishes a Consumer Confidence Report (CCR) annually, as required by the Safe Drinking Water Act, which is sent to all water customers. Information concerning the Source Water Assessment is included in the CCR. In the future, the system will include a reference to this source water protection plan and how customers can access a copy.	Utility Staff	Yearly	This would be in addition to required Source Water Assessment information, including source of water and susceptibility to contamination.	CCR required by SDWA, included in annual budget.
Brochures, pamphlets, and letters	Send a letter and/or brochure providing educational information to residences and businesses. These will alert the recipients of the need for source water protection and conservation. Businesses that use greater-than-household quantities of regulated substances may receive a different letter.	Yearly	Within a year	There is a sample Brochure attached in **Appendix E** that could be used to provide information about source water protection to customers.	Cost in brochure printing and mailing
School Curricula	Work with the school system to incorporate source water activities into the school curricula. Visit school or invite students for a plant tour to tie in with school curricula. Ask the school to include message in school newsletter to raise awareness about source water protection and conservation.	Utility Staff	Yearly, as requested by local schools.	Operator will initiate effort, locate the appropriate individuals in school and/or on local school board. Can provide websites with free education materials to promote source water protection and conservation. Also operator may visit school or invite students	Minimal costs. Would require time to coordinate, visit classroom and provide tour.

				for a plant tour to tie in with classroom materials.	
Partner with Watershed Association	Partner with watershed associations or other civic groups. These groups may have similar goals and available volunteers that can integrate source water protection into their efforts.	Utility Staff	-	One such organization is the Meadow River Watershed Association. To learn more about this organization contact them at Meadow River Watershed Association, Inc., P.O. Box 633, Rainelle, WV 25962. Office Phone: 304-438-6225, Email: info@meadowriver.org	Cost associated with participation in activities.

11.0 CONTINGENCY PLAN

The goal of contingency planning is to identify and document how the utility will prepare for and respond to any drinking water shortages or emergencies that may occur due to short and long term water interruption, or incidents of spill or contamination. During contingency planning, utilities should examine their capacity to protect their intake, treatment, and distribution system from contamination. They should also review their ability to use alternative sources and minimize water loss, as well as their ability to operate during power outages. In addition, utilities should report the feasibility of establishing an early warning monitoring system and meeting future water demands.

Isolating or diverting any possible contaminant from the intake for a public water system is an important strategy in the event of an emergency. One commonly used method of diverting contaminants from an intake is establishing booms around the intake. This can be effective, but only for contaminants that float on the surface of the water. Alternatively, utilities can choose to pump floating contaminants from the water or chemically neutralize the contaminant before it enters the treatment facility.

Public utilities using surface sources should be able to close the intake by one means or another. However, depending upon the system, methods for doing so could vary greatly and include closing valves, lowering hatches or gates, raising the intake piping out of the water, or shutting down pumps. Systems should have plans in place in advance as to the best method to protect the intake and treatment facility. Utilities may benefit from turning off pumps and, if possible, closing the intake opening to prevent contaminants from entering the piping leading to the pumps. Utilities should also have a plan in place to sample raw water to identify the movement of a contaminant plume and allow for maximum pumping time before shutting down an intake (See Early Warning Monitoring System). The amount of time that an intake can remain closed depends on the water infrastructure and should be determined by the utility before an emergency occurs. The longer an intake can remain closed in such a case, the better.

Raw and treated water storage capacity also becomes extremely important in the event of such an emergency. Storage capacity can directly determine how effectively a water system can respond to a contamination event and how long an intake can remain closed. Information regarding the water shortage response capability of Wilderness PSD is provided in **Table 11**.

11.1 RESPONSE NETWORKS AND COMMUNICATION

Statewide initiatives for emergency response, including source water related incidents, are being developed. These include the West Virginia Water/Wastewater Agency Response Network (WV WARN, see http://www.wvwarn.org/) and the Rural Water Association Emergency Response Team (see http://www.wvrwa.org/). Wilderness PSD has analyzed its ability to effectively respond to emergencies and this information is also provided in **Table 11**.

Table 11. Wilderness PSD Water Shortage Response Capability

Can the utility isolate or divert contamination from the intake or groundwater supply?	Yes
Describe the utility's capability to isolate or divert potential contaminants:	The utility has booms they can deploy to protect the intake from surface contaminants.
Can the utility switch to an alternative water source or intake that can supply full capacity at any time?	Yes
Describe in detail the utility's capability to switch to an alternative source:	Wilderness has two separate intakes on two different water sources. The primary intake is in the Meadow River and the secondary intake is in Anglins Creek near the mouth. While the Anglins Creek intake is considered a separate source,

	backwaters from the Meadow River likely influence the intake. Thus, any contamination event on the Meadow River may also compromise the Anglins Creek intake. If Meadow River is impacted by a contamination event, the utility has considered running a temporary line upstream of the point of contamination or upstream of the backwaters of Meadow River on Anglins Creek. Wilderness has also considered relocating the permanent intake on Anglins Creek above the backwaters.
Can the utility close the water intake to prevent contamination from entering the water supply?	Yes
How long can the intake stay closed?	If the utility was able to use the Anglins Creek intake (assuming it is not influenced by backwaters), they could leave the Meadow River intake closed indefinitely depending on seasonal water levels in Anglins Creek. If they had to close both intakes, their treated water storage would approximately 2.7 days.
Describe the process to close the intake:	The utility can manually close valves to shut the intake off from the treatment plant.
Describe the treated water storage capacity of the water system:	The utility has 7 treated storage water tanks and 3 booster pump stations (BPS) Zoar Tank-150,000 gal. Mt. Lookout Tank 1-100,000 gal. Mt. Lookout Tank 2-100,000 gal. Mt. Nebo Tank 1-200,000 gal. Mt. Nebo Tank 2-200,000 gal. Old Nicholas Tank- 32,000 gal. Snow Hill Tank- 125,000 gal. **Total- 907,000 gallons treated water storage** The utility does not have raw water storage.
Is the utility a member of WVRWA Emergency Response Team?	The utility is a member of WV Rural Water but not the Emergency Response Team
Is the utility a member of WV-WARN?	Yes
List any other mutual aid agreements to provide or receive assistance in the event of an emergency:	The utility has informal mutual aid agreements with other nearby water utilities such as Summersville Municipal Water. Wilderness PSD has hauled water from Summersville in water tankers during past emergencies.

11.2 OPERATION DURING LOSS OF POWER

Wilderness PSD analyzed its ability to operate effectively during a loss of power. This involved ensuring a means to supply water through treatment, storage, and distribution without creating a public health emergency. Information regarding the utility's capacity for operation during power outages is summarized in **Table 12**.

Table 12. Generator Capacity

What is the type and capacity of the generator needed to operate during a loss of power?	The water system requires 5 generators to operate at full capacity during a power outage. The utility has stationary generators at the treatment plant, water utility office, and all three of the booster pump stations. The utility has plans to purchase a portable generator as a backup in case one of the others are out of service.	
Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.	No. The intake pumps are powered by the treatment plant so they do not require a generator of their own.	
Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.	Yes. The treatment plant is equipped with a 150 kW diesel generator that is hardwired to a transfer switch that must be manually switched over.	
Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.	Yes. All three booster pump stations in the distribution system are hardwired to generators, some of which are manually operated and some which engage automatically. The following generators are located throughout the distribution system: Runa BPS- 20kW propane Old Nicholas Rd. BPS- 65 kW propane Snow Hill BPS-41 kW diesel Water Utility Office- 20kW propane	
Does the utility have adequate fuel on hand for the generator?	Yes	
What is your on-hand fuel storage and how long will it last operating at full capacity?	**Gallons**	**Hours**
	Water treatment plant-300 gal. diesel storage tank	36 hours
	Runa BPS-120 gal. propane storage	100+ hours
	Old Nicholas Rd. BPS- 120 gal. propane storage	40 hours
	Snow Hill BPS- 200 gal. diesel storage	36 hours
	Utility Office- 120 gal. propane storage	100+ hours

		Supplier	Phone Number
Provide a list of suppliers that could provide generators and fuel in the event of an emergency:	**Generator**	Cummins Crosspoint- Cross Lanes, WV	304-769-1012
	Generator	Sunbelt Rentals- Charleston, WV	304-342-5000
	Fuel	Wilderness PSD-Portable Diesel Fuel Tank	N/A
	Fuel	U-Save Propane- Mt. Nebo, WV	304-872-9334
Does the utility test the generator(s) periodically?		Yes- The utility runs a monthly test on their generators.	
Does the utility routinely maintain the generator?		In the past, the utility has maintained their generators on a yearly basis. In 2015, they hired Cummins to perform yearly maintenance on the systems and plan to do this again in future years.	
If no scenario describing the ability to connect to generator matches the utility's system or if utility does not have ability to connect to a generator, describe plans to respond to power outages:		N/A	

11.3 FUTURE WATER SUPPLY NEEDS

When planning for potential emergencies and developing contingency plans, a utility needs to not only consider their current demands for treated water but also account for likely future needs. This could mean expanding current intake sources or developing new ones in the near future. This can be an expensive and time consuming process, and any water utility should take this into account when determining emergency preparedness. Wilderness PSD has analyzed its ability to meet future water demands at current capacity, and this information is included in **Table 13**.

Table 13. Future Water Supply Needs for Wilderness PSD

Is the utility able to meet water demands with the current production capacity over the next 5 years? If so, explain how you plan to do so.	Yes. The treatment plant currently has excess capacity and they do not expect any significant changes in population in the service area in the next 5 years. The water system's opinions concerning the demand for the next five years are generally supported by population trends projected based on US Census Bureau 2000 and 2010 data. According to the 2005 Interim State Population Projections (1), WV as a whole will see a population decline between 2010 and 2030. In addition, researchers at the WVU College of Business and Economics specifically project that populations within Nicholas County will decrease from actual population of 26,233 in 2010 to a projected population of 25,878 in 2020 (2). Census data and projections cannot account for increases in daily demand due to water line extensions. If in the future water line extension projects are proposed the daily demands will be

	reassessed to determine if the source and treatment facilities can support increased demand.
If not, describe the circumstances and plans to increase production capacity:	N/A

(1)US Department of Commerce, United State Census Bureau. 2005 Interim State Population Projections. Table 1. http://www.census.gov/population/projections/data/state/projectionsagesex.html. Accessed June 10, 2015.

(2) Christiadi, Ph.D., Deskins, John, Ph.D., Lego, Brian. WVU College of Business and Economics, Bureau of Business and Economic Research. March 2014. WVU Research Corporation. http://be.wvu.edu/bber/pdfs/BBER-2014-04.pdf Accessed June 10, 2015

11.4 WATER LOSS CALCULATION

In any public water system there is a certain percentage of the total treated water that does not reach the customer. Some of this water is used in treatment plant processes such as back washing filters or flushing piping, but there is usually at least a small percentage that goes unaccounted for. To measure and report on this unaccounted for water, a public utility must use the method described in the Public Service Commission's rule, *Rules for the Government of Water Utilities*, 150CSR7, section 5.6. The rule defines unaccounted for water as the volume of water introduced into the distribution system less all metered usage and all known non-metered usage which can be estimated with reasonable accuracy.

To further clarify, metered usages are most often those that are distributed to customers. Non-metered usages that are being estimated include usage by fire departments for fires or training, un-metered bulk sells, flushing to maintain the distribution system, and water used for backwashing filters and cleaning settling basins. By totaling the known metered and non-metered uses the utility calculates unaccounted for water. Note: To complete annual reports submitted to the PSC, utilities typically account for known water main breaks by estimating the amount of water lost. However, for the purposes of the source water protection plan, any water lost due to leaks, even if the system is aware of how much water is lost at a main break, is not considered a use. Water lost through leaks and main breaks cannot be controlled during a water shortages or other emergencies and should be included in the calculation of percentage of water loss for purposes of the source water protection plan. The data in **Table 14** is taken from the most recently submitted Wilderness PSD PSC Annual Report.

Table 14. Water Loss Information

Total Water Pumped (gal)		105,671,000
Total Water Purchased (gal)		0
Total Water Pumped and Purchased (gal)		105,671,000
Water Loss Accounted for Except Main Leaks (gal)	**Mains, Plants, Filters, Flushing, etc.**	4,083,000
	Fire Department	6,000
	Back Washing	0
	Blowing Settling Basins	0
Total Water Loss Accounted For Except Main Leaks		4,089,000

Water Sold- Total Gallons (gal)	79,128,000
Unaccounted For Lost Water (gal)	3,032,000
Water lost from main leaks (gal)	22,454,000
Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)	25,486,000
Total Percent Unaccounted For Water and Water Lost from Main Leaks (gal)	24%
If total percentage of Unaccounted for Water is greater than 15%, please describe any measures that could be taken to correct this problem:	The utility has an ongoing leak detection program and actively manages pressure within the system to minimize water loss.

*This information was taken from the 2015 Public Service Commission Annual Report for Wilderness PSD

11.5 EARLY WARNING MONITORING SYSTEM

Public water utilities are required to provide an examination of the technical and economic feasibility of implementing an early warning monitoring system. Implementing an early warning monitoring system may be approached in different ways depending upon the water utility's resources and threats to the source water. A utility may install a continuous monitoring system that will provide real time information regarding water quality conditions. This would require utilities to analyze the data to establish what condition is indicative of a contamination event. Continuous monitoring will provide results for a predetermined set of parameters. The more parameters that are being monitored, the more sophisticated the monitoring equipment will need to be. When establishing a continuous monitoring system, the utility should consider the logistics of placing and maintaining the equipment, and receiving output data from the equipment.

Alternately, or in addition, a utility may also pull periodic grab samples on a regular basis, or in case of a reported incident. The grab samples may be analyzed for specific contaminants. A utility should examine their PSSCs to determine what chemical contaminants could pose a threat to the water source. If possible, the utility should plan in advance how those contaminants will be detected. Consideration should be given to where samples will be collected, the preservations and hold times for samples, available laboratories to analyze samples, and costs associated with the sampling event. Regardless of the type of monitoring (continuous or grab), utilities should collect samples for their source throughout the year to better understand the baseline water quality conditions and natural seasonal fluctuations. Establishing a baseline will help determine if changes in the water quality are indicative of a contamination event and inform the needed response.

Every utility should establish a system or process for receiving or detecting chemical threats with sufficient time to respond to protect the treatment facility and public health. All approaches to receiving and responding to an early warning should incorporate communication with facility owners and operators that pose a threat to the water quality, with state and local emergency response agencies, with surrounding water utilities, and with the public. Communication plays an important role in knowing how to interpret data and how to respond.

Wilderness PSD has analyzed its ability to monitor for and detect potential contaminants that could impact its source water. Information regarding this utility's early warning monitoring system capabilities is provided in **Table 15** and in **Appendix B.**

Table 15. Early Warning Monitoring System Capabilities

<table>
<tr><td colspan="2">Does your system currently receive spill notifications from a state agency, neighboring water system, local emergency responders, or other facilities? If yes, from whom do you receive notices?</td><td colspan="3">Yes. Wilderness PSD regularly receives notifications from the WV Department of Environmental Protection and WV Bureau for Public Health.</td></tr>
<tr><td colspan="2">Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?</td><td colspan="3">The 2011 Source Water Protection Plan identified potential contaminant sources and critical areas from which a spill could be expected, including highways, log landing sites, and mine sites.</td></tr>
<tr><td colspan="2">Are you prepared to detect potential contaminants if notified of a spill?</td><td colspan="3">Yes</td></tr>
<tr><td colspan="2" rowspan="4">List laboratories (and contact information) on whom you would rely to analyze water samples in case of a reported spill.</td><td colspan="3">Laboratories</td></tr>
<tr><td colspan="2">Name</td><td>Contact</td></tr>
<tr><td colspan="2">Analabs- Crab Orchard, WV</td><td>1-800-880-6406, analabs@analabsinc.com</td></tr>
<tr><td colspan="2">REIC Laboratory- Beaver, WV</td><td>800-999-0105, 304-255-2500, info@reiclabs.com</td></tr>
<tr><td colspan="2">Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?</td><td colspan="3">Yes. The utility tests the incoming raw water every two hours while they are in operation and sometimes more often depending on turbidity, pre-sedimentation effluent, and pre-chlorine levels. They have established baseline water quality conditions for their primary water sources.</td></tr>
<tr><td colspan="2">Does your utility currently monitor raw water (through continuous monitoring or periodic grab samples) at the surface water intake or from a groundwater source on a regular basis?</td><td colspan="3">No. See attached Form B in Appendix B.</td></tr>
<tr><td rowspan="3">Provide or estimate the capital and O&M costs for your current or proposed early warning system or upgraded system.</td><td>Monitoring System</td><td>YSI EXO 2 (B-1)</td><td>Hach sc1000 (B-2)</td><td>Real Tech Full Scanning Monitoring System (B-3)</td></tr>
<tr><td>Capital</td><td>Approximate Capital Cost- $19,000</td><td>Approximate Capital Cost- $18,907</td><td>Approximate Capital Cost- $24,155</td></tr>
<tr><td>Yearly O & M</td><td>Parts and calibration-</td><td>Full service contract with Hach</td><td>Replacement Lamps- $1,480</td></tr>
</table>

		Approximately $1000 Data management and telemetry- $1000	Technician- $2,258 Online Viewer- $600	Smart-Sense Monitoring Service- $499
Do you serve more than 100,000 customers? If so, please describe the methods you use to monitor at the same technical levels utilized by ORSANCO.		No		

12.0 SINGLE SOURCE FEASIBILITY STUDY

If a public water utility's water supply plant is served by a single–source intake to a surface water source of supply or a surface water influenced source of supply, the submitted source water protection plan must also include an examination and analysis of the technical and economic feasibility of alternative sources of water to provide continued safe and reliable public water service in the event that its primary source of supply is detrimentally affected by contamination, release, spill event or other reason. These alternatives may include a secondary intake, two days of additional raw or treated water storage, an interconnection with neighboring systems, or other options identified on a local level. Note: a suitable secondary intake would draw water supplies from a substantially different location or water source.

To accomplish this requirement, utilities should examine all existing or possible alternatives and rank them by their technical, economic, and environmental feasibility. To have a consistent and complete method for ranking alternatives, WVBPH has developed a feasibility study guide. This guide provides several criteria to consider for each category, organized in a Feasibility Study Matrix. By completing the Feasibility Study Matrix, utilities will demonstrate the process used to examine the feasibility of each alternative and document scores that compare the alternatives. The Feasibility Study matrix and summary of the results are presented in an alternatives feasibility study attached as **Appendix D**.

13.0 COMMUNICATION PLAN

Wilderness PSD has also developed a Communication Plan that documents the manner in which the public water utility, working in concert with state and local emergency response agencies, shall notify the local health agencies and the public of the initial spill or contamination event and provide updated information related to any contamination or impairment of the system's drinking water supply. The initial notification to the public will occur in any event no later than thirty minutes after the public water system becomes aware of the spill, release, or potential contamination of the public water system. A copy of the source water protection plan and the Communication Plan has been provided to the local fire department. Wilderness PSD will update the Communication Plan as needed to ensure contact information is up to date.

Procedures should be in place to effectively react to the kinds of catastrophic spills that can reasonably be predicted at the source location or within the SWPA. The chain-of-command, notification procedures and response actions should be known by all water system employees.

The WVBPH has developed a recommended communication plan template that provides a tiered incident communication process to provide a universal system of alert levels to utilities and water system managers. The comprehensive Communication Plan for Wilderness PSD is attached as **Appendix C** for internal review and planning purposes only.

The West Virginia Department of Environmental Protection is capable of providing expertise and assistance related to prevention, containment, and clean-up of chemical spills. The West Virginia Department of Environmental Protection Emergency Response 24-hour Phone is 1-800-642-3074. The West Virginia Department of Environmental Protection also operates an upstream distance estimator that can be used to determine the distance from a spill site to the closest public water supply surface water intake.

14.0 EMERGENCY RESPONSE SHORT FORM

A public water utility must be prepared for any number of emergency scenarios and events that would require immediate response. It is imperative that information about key contacts, emergency services, and downstream water systems be posted and readily available in the event of an emergency. Elements of this source water protection plan, such as the contingency planning and communication plan, may contain similar information to the utility's emergency response plan. However, the emergency response plan is to be kept confidential and is not included in this source water protection plan. An Emergency Short Form is included in **Appendix C** to support the Communicate Plan by providing quick access to important information about emergency response and are to be used for internal review and planning purposes only.

15.0 CONCLUSION

This report represents a detailed explanation of the required elements of Wilderness PSD's Source Water Protection Plan. Any supporting documentation or other materials that the utility considers relevant to their plan can be found in **Appendix E**.

This source water protection plan is intended to help prepare community public water systems all over West Virginia to properly handle any emergencies that might compromise the quality of the system's source water supply. It is imperative that this plan is updated as often as necessary to reflect the changing circumstances within the water system. The protection team should continue to meet regularly and continue to engage the public whenever possible. Communities taking local responsibility for the quality of their source water is the most effective way to prevent contamination and protect a water system against contaminated drinking water. Community cooperation, sufficient preparation, and accurate monitoring are all critical components of this source water protection plan, and a multi-faceted approach is the only way to ensure that a system is as protected as possible against source water degradation.

APPENDIX A. FIGURES

Lists of Potential Sources of Significant Contamination

Wilderness PSD- PSSC Summary

PSSC Layer	In ZCC	Around ZCC	In ZPC	Around ZPC	In Watershed	Total Records
Mining Outlets	14	12	43	44	620	733
NPDES Permits	5	2	7	17	35	66
Bond Forfeiture Sites	0	2	0	14	43	59
USEPA Regulated Sites	6	0	19	33	45	103
Field Verified PSSCs	15	6	30	23	41	115
Oil/Gas Wells	4	12	0	4	8	28
Above Ground Storage Tanks	2	3	1	10	91	107
Leaking Underground Storage Tanks	0	0	2	3	3	8
Volunteer Remediation	0	0	0	1	1	2
Coal Refuse Sites	0	0	0	2	3	4
Total	**46**	**37**	**102**	**151**	**889**	**1225**

Field Verified PSSCs (SWAP_PCS) – Figure A-5

PSSC Number	Map Code	Site Name	Site Description	Relative Risk Score	Survey Date	Comments
1	A-18	Pasture	Haynes Farm with beef cattle	2.00	5/6/2011	none
2	I-44	Other (specify source)	Drilling Rig		5/6/2011	Not sure may be set to drill. Bit on ground with few tailings
3	A-20	Silviculture (logging)	Timber Harvest	3.78	5/6/2011	none
4	I-24	Mining: Surface	Eagle Ridge Development Mining Entrance	5.22	5/6/2011	Same as R-12 thru R-15
5	A-20	Silviculture (logging)	Timber Staging	3.78	5/6/2011	Same as R-19
6	M-5	Drinking Water Treatment Plants	Wilderness PSD Drinking Water Treatment Plant	1.50	5/6/2011	Same as R-18 and R-4
7	A-20	Silviculture (logging)	Timbering	3.78	5/6/2011	none

PSSC Number	Map Code	Site Name	Site Description	Relative Risk Score	Survey Date	Comments
8	A-18	Pasture	Beef Cattle	2.00	5/6/2011	none
9	C-9	Cemeteries	Pleasant Hill United Methodist Church	1.24	5/6/2011	none
10	A-20	Silviculture (logging)	Clear Cut	3.78	5/6/2011	No photo / seeded down
11	M-7	Highway	Highway Bridge	6.15	5/6/2011	Stream crossing - just good photo
12	C-32	Nursing Homes	Heartland Of Rainelle	0.95	9/3/2010	Nursing home (60 residents). Backup generator with 150 gal. Diesel fuel tank (double lined), 2-lp tanks (1000 gal. & 500 gal.) For heating & kitchen facilities.
13	C-34	Paint stores	Rainelle Graphic Arts And Signs	1.05	8/27/2010	Graphic arts and signs. Minimal quantities of paints & thinners. Materials purchased as needed
14	I-27	Permitted Discharge Pipe (outfall)	Inaccessible Georiga Pacific lumber mill stormwater discharge pipe	5.07	8/27/2010	Inacessible Georgia pacific outlet #003 permit wv g610538
15	C-48	Underground Storage Tanks	Former Service & Parts Inc. now closed	2.97	8/27/2010	The underground storage tank has not been in use for over 30 years. The business was a wrecker service. **tanks removed.
16	M-29	Wastewater Treatment Plant	Greenbrier PSD #2 Sewage Treatment Plant	4.03	8/27/2010	Sewer treatment plant 1.3 mgd dual oxidation ditches
17	I-14	Hazardous waste storage, treatment, recycling	CSX Facility / Mechanical Environmental Operations Center	4.90	8/27/2010	Oil water separator petroleum distillates / naptholene containment, 150 gal. Containor, spill containment equipment storage **not in use right now
18	C-37	Pharmacies	Terminal Drug Company - Closed	1.10	8/27/2010	No longer a pharmacy
19	C-37	Pharmacies	Rite Aid Pharmacy	1.10	9/3/2010	Pharmacy with film development on site

PSSC Number	Map Code	Site Name	Site Description	Relative Risk Score	Survey Date	Comments
20	C-41	Railroad Tracks and Yards	CSX Rail Yard with 500 Gallon Double Walled Tank For Blowdown With Additional Pressure Tanks	10.00	8/27/2010	Railroad yard & tracks with 500 gal. Double walled blowdown tank with pressure tanks. 5 sets of tracks (including sidings), old railroad station 600' north east of kanawha avenue route 20
21	C-7	Car dealerships	Sewell Valley Tractor - Closed	1.20	8/27/2010	New & used tractor for sale with implements. Minimal use of service dept.
22	C-7	Car dealerships	Rainelle Chrysler/Plymouth/Dodge Dealer - Closed	1.20	8/27/2010	Above ground fuel tank is still located behind building. Business is closed.
23	C-8	Car washes	Auto Bath And Body Wash with 4 Bays	1.70	9/3/2010	4 bay car wash asphalt outside, concrete inside bay
24	I-14	Hazardous waste storage, treatment, recycling	Center Chevrolet car dealership - Closed	4.90	8/27/2010	Closed and everything is gone.
25	I-27	Permitted Discharge Pipe (outfall)	Inaccessible Georiga Pacific lumber mill stormwater discharge pipe	5.07	8/27/2010	Inacessible Permitted outfall permit #wvg610538 outfall 002
26	I-30	Public Utilities (phone, gas, electric power)	Transformer Storage	3.10	8/27/2010	AEP transformer storage completely cleaned up. Nothing there.
27	I-27	Permitted Discharge Pipe (outfall)	Not Found. Rainelle Water Treatment Plant Discharge	5.07	9/3/2010	Not Found. Bank overgrown with veg. Rainelle water treatment plant discharge to Sewell Creek. NPDES wv0115754, outfall 01
28	C-48	Underground Storage Tanks	State Police facility observed	2.97	8/27/2010	Underground storage tanks belonging to W.V. State Police have been removed per Sgt. Gunnoe (to his knowledge).
29	C-7	Car dealerships	Tri County Pre-Owned Cars formerly Accel Discount Tire Shop / Garage	1.20	9/3/2010	Retail tire shop and auto servicing. Above ground used oil storage tank, oil changes. Note originally McCall's service center. Gas tanks removed 10 years ago per brad Starcher, mgr.

PSSC Number	Map Code	Site Name	Site Description	Relative Risk Score	Survey Date	Comments
30	I-41	Wood preserving/treatment facilities	Georgia Pacific lumber mill	4.72	8/27/2010	Self-contained above ground diesel fuel tanks (3,000 gallon & 4,000 gallon tank), below ground anti-stain treatment (8'x20'x6') (n-aexgin)
31	C-31	Medical/dental offices/clinics	Professional Building 1102 Main St. with doctors' offices	1.10	8/27/2010	Professional building with offices for dental, optical, and medical doctors
32	C-18	Gas Stations	Pit Row #235 Liberty Gas Station & Convenience Store	2.88	8/27/2010	Gas station & convenience store with underground gasoline storage tanks
33	C-20	Golf courses	Greenbrier Hills Golf & Tennis Club	1.17	8/27/2010	Golf course with green and golf carts
34	C-18	Gas Stations	Rainelle J & J Exxon Station and convenience store	2.88	8/27/2010	Exxon gasoline station / convenience store. Below ground gasoline tanks, above ground diesel & kerosene tanks, Reynolds Oil company owns property (Tommy Reynolds (304) 645-1920). Leased by Janet Isaacs (Exxon station (304) 438-6770).
35	C-15	Funeral services and crematories	Smather's Funeral Chapel	1.68	8/27/2010	Funeral home
36	C-3	Auto repair shops	Martins Auto Service appears to be closed or only used for storage	2.73	8/27/2010	Auto repair shop
37	C-21	Hardware/lumber/parts stores	Flint's Ace Hardware	1.17	8/27/2010	Hardware store: pressure treated lumber, landscape timbers stored outside. Seasonal fertilizers (under roof), oil changed in lawn mowers (oil stored in drums and recycled
38	C-18	Gas Stations	Go Mart gas station and convenience store with 8 pumps	2.88	8/27/2010	Gas station & convenience store with underground gasoline storage tanks
39	C-23	Historic gas stations	Rich Gas Station now closed tanks pulled	3.00	8/27/2010	Closed and underground storage tanks removed

PSSC Number	Map Code	Site Name	Site Description	Relative Risk Score	Survey Date	Comments
40	C-15	Funeral services and crematories	Wallace & Wallace Inc. Funeral Home	1.68	8/27/2010	Funeral home is connected to city sewer
41	M-14	Military Base (past and present)	811 Ordance / U.S. Army Reserve Center with vehicles and 3 service bays	3.99	8/27/2010	Army reserve center with army trucks & equipment stored.
42	M-30	Wells: abandoned	Rainelle Water System Well #5	1.40	9/3/2010	Well #5 is enclosed in building. Altitude / elev. 733.835 meters. Located behind PSD building.
44	C-27	Laundromats	Rainelle Maytag Laundromat	1.08	8/27/2010	Commercial laundromat hooked to city sewer
45	A-7	Crops: other	Appalachian Root And Herb Company	3.36	8/27/2010	Hanging & dry boxes for moss. Wholesaler for dried moss. No chemicals used. The moss is shipped out after bagged and dried.
47	M-6	Fire Stations	Rainelle Volunteer Fire Department	1.19	8/27/2010	Rainelle Volunteer Fire Department with vehicle bays and above ground diesel tank
48	C-18	Gas Stations	#126 One Stop (Chevron Station)	2.88	8/27/2010	3-underground gasoline tanks (2-4,000 gal. & 1-6,000 gal). 2-above ground diesel & kerosene (2,000 gal. Each).
49	I-27	Permitted Discharge Pipe (outfall)	Greenbrier PSD #2 Sewage Treatment Plant	5.07	9/3/2010	Outfall two oxidation ditches 150 cl2 gas cylinders / dechlorinate with sodium chlorite
50	C-31	Medical/dental offices/clinics	Rainelle Medical Center with pharmacy	1.10	8/27/2010	Medical center with physician offices, clinical services, pharmacy, pediatric services, women's cancer (outreach information program), mental health.
51	M-5	Drinking Water Treatment Plants	Rainelle Water System Water Treatment Plant	1.50	9/3/2010	Water treatment plants appears to be in good working condition
52	M-23	Sewer Lines	Lilly Park Greenbrier Co. PSD#2 lift station	6.00	8/27/2010	Below ground sewer lift station
53	C-53	Other (specify source)	J&S Restaurant open for business		8/27/2010	none
54	M-26	Swimming Pools	Rainelle City Swimming Pool	0.60	9/3/2010	none

PSSC Number	Map Code	Site Name	Site Description	Relative Risk Score	Survey Date	Comments
55	C-37	Pharmacies	Rainelle Pharmacy	1.10	3/1/2011	Operated identified this during the follow up meeting. Location data was derived from address and GIS.
56	C-53	Other (specify source)	JW's Tavern may have septic system		5/6/2011	none
57	C-9	Cemeteries	Brackens Creek United Methodist Church Cemetery	1.24	5/6/2011	none
58	M-7	Highway	Highway bridge over Meadow River	6.15	5/6/2011	none
59	A-18	Pasture	Pasture	2.00	5/6/2011	Could not see what was pastured but recent activity at feeder
60	I-21	Material stockpiles (coal, metallic ores, phosphates, gypsum)	GREEN VALLEY COAL COMPANY	3.68	9/26/2001	COAL PREP PLANT
61	I-24	Mining: Surface	RAINELLE LAND DEV. CORP	5.22	9/25/2001	RAINELLE LAND DEV. CORP
62	A-20	Silviculture (logging)	Silviculture logged area 4	3.78	7/20/2001	
63	C-53	Other (specify source)	Amoco Little General Store		6/24/2002	General Store
64	C-41	Railroad Tracks and Yards	CSX RAILROAD	10.00	9/27/2001	CSX RAILROAD TRACKS NEAR WELL #1
65	I-39	Wells: Injection	Greenbrier PSD #2 Leslie well house	3.60	9/25/2001	Rodney Knapp, Roger Thornton
66	M-23	Sewer Lines	SEWER SYSTEM	6.00	9/25/2001	SEWER SYSTEM
67	I-44	Other (specify source)	WILDERNESS PSD			Individual Industrial
69	A-20	Silviculture (logging)	Silviculture (logging) area 1	3.78	7/20/2001	
71	A-20	Silviculture (logging)	Silviculture (logging) area 2	3.78	7/20/2001	
72	C-10	Construction areas	construction area	3.48	7/20/2001	clear cut for impoundment and lake construction
73	A-20	Silviculture (logging)	Silviculture active logging operation 3	3.78	7/20/2001	
74	C-48	Underground Storage Tanks	Amoco Little General Store	2.97	6/24/2002	General Store
75	C-49	Utility Substation Transformers	AEP McCLUNG SUBSTATION	2.95	9/27/2001	ELECTRIC SUBSTATION

PSSC Number	Map Code	Site Name	Site Description	Relative Risk Score	Survey Date	Comments
76	M-5	Drinking Water Treatment Plants	GREENBRIER CO. PSD #2	1.50	9/26/2001	WATER TREATMENT PLANT RAW WATER BASIN
77	M-5	Drinking Water Treatment Plants	GREENBRIER CO. PSD #2	1.50	9/26/2001	WATER TREATMENT PLANT
79	I-24	Mining: Surface	JOHN BROWN HARRIS INC	5.22	9/25/2001	JOHN BROWN HARRIS INC
80	I-39	Wells: Injection	Greenbrier PSD #2 New River and Pocahontas #2 mine	3.60	9/25/2001	Rodney Knapp, Roger Thornton

*Only 80 of 115 total field-verified PSSCs were prioritized and labeled due to their severity or their proximity to the intake or ZCC.

Above Ground Storage Tanks (AST_with_Chemicals) – Figure A-9

R-Number	Regulation Type	Tank Label	Responsible Party	In ZCC	Year Constructed	Capacity (gal)	Comments	Age Priority	Size Priority
R-1	AST	010-00000021	AT&T SERVICES, INC.	No	1994	[redacted]		3	4
R-2	AST	013-00000014	GREEN VALLEY COAL COMPANY	No	2001			3	4
R-3	AST	013-00000014	GREEN VALLEY COAL COMPANY	No	2001			3	4
R-4	AST	013-00000016	GREEN VALLEY COAL COMPANY	No	2000			3	4
R-5	AST	013-00000016	GREEN VALLEY COAL COMPANY	No	2000			3	4
R-6	AST	013-00000017	GREEN VALLEY COAL COMPANY	No	2000			3	4
R-7	AST	013-00000017	GREEN VALLEY COAL COMPANY	No	2000			3	4
R-8	AST	013-00000018	GREEN VALLEY COAL COMPANY	No	2000			3	4
R-9	AST	013-00000018	GREEN VALLEY COAL COMPANY	No	2000			3	4
R-10	AST	013-00000171	GREENBRIER CNTY PSD NO 2	No	1978			4	4
R-11	AST	013-00000172	GREENBRIER CNTY PSD NO 2	No	1978			4	4
R-12	AST	013-00000138	GREENBRIER CO BOARD OF ED	No	1985			2	4
R-13	AST	010-00000607	DANESE PSD	No	2011			4	4
R-14	AST	013-00000099	R T ROGERS OIL CO INC	No	2008			3	4

R-Number	Regulation Type	Tank Label	Responsible Party	In ZCC	Year Constructed	Capacity (gal)	Comments	Age Priority	Size Priority
R-15	AST	013-00000015	GREEN VALLEY COAL COMPANY	No	2001	[redacted]		3	4
R-16	AST	013-00000015	GREEN VALLEY COAL COMPANY	No	2001			3	4
R-17	AST	034-00000111	WILDERNESS PSD	No	2003			4	4
R-18	AST	034-00000157	EXCO RESOURCES (PA), LLC	No	2009			3	4
R-19	AST	013-00000096	DEITZ, LARRY ALAN	No	1955			2	4
R-20	AST	034-00000113	WILDERNESS PSD	Yes	2001			4	4
R-21	AST	034-00000159	EXCO RESOURCES (PA), LLC	Yes	2009			3	4
R-22	AST	013-00000155	RUPERT TOWN OF	No	1950			2	1
R-23	AST	020-00001532	KANAWHA EAGLE COAL LLC	No	2011			3	1
R-24	AST	020-00001532	KANAWHA EAGLE COAL LLC	No	2011			3	1
R-25	AST	020-00001532	KANAWHA EAGLE COAL LLC	No	2011			3	1
R-26	AST	013-00000124	SOUTH FORK COAL COMPANY LLC	No	2013			3	1
R-27	AST	013-00000154	RUPERT TOWN OF	No	1975			2	1
R-28	AST	013-00000044	RUPERT OIL CO INC	No	1970			2	2
R-29	AST	013-00000105	BURNS MOTOR FREIGHT INC	No	1997			3	2
R-30	AST	013-00000105	BURNS MOTOR FREIGHT INC	No	1997			3	2
R-31	AST	045-00000020	WVDEP OFFICE OF ENVIRONMENTAL REMEDIATION	No	2003			3	2
R-32	AST	013-00000045	RUPERT OIL CO INC	No	1970			2	3
R-33	AST	013-00000046	RUPERT OIL CO INC	No	1970			2	3
R-34	AST	013-00000130	WVDOH-EQUIPMENT DIVISION	No	2007			3	3
R-35	AST	013-00000130	WVDOH-EQUIPMENT DIVISION	No	2007			3	3
R-36	AST	013-00000126	SOUTH FORK COAL COMPANY LLC	No	2013			3	3
R-37	AST	999-00001366	VECELLIO & GROGAN, INC	No	1980			2	4
R-38	AST	999-00001366	VECELLIO & GROGAN, INC	No	1980			2	4

*Only 38 of 123 total sites were prioritized and labeled due to their severity or proximity to the intake or ZCC.

Oil and Gas Wells (ERIS_Wells) – Figure A-6

R-Number	Regulation Type	Permit Number	Responsible Party	Farm Name	Well Status	Well Number	Marcellus	In ZCC
R-39	ERIS	2500028	CABOT OIL & GAS CORPORATION	WESTVACO CORPORATION	ND	0	No	No
R-40	ERIS	2500022	COLUMBIA NATURAL RESOURCES, LLC	GAULEY COAL & LAND CO.	PL	1-20059-T	No	No
R-41	ERIS	2500022	COLUMBIA NATURAL RESOURCES, LLC	GAULEY COAL & LAND CO.	PL	1-20059-T	No	No
R-42	ERIS	2104216	WACO OIL & GAS CO INC	BOWMAN, FRANK L.	ND	WACO 319	No	No
R-43	ERIS	6700197	OPERATOR UNKNOWN	GAULEY COAL	PL	10084	No	No
R-44	ERIS	6700796	CABOT OIL & GAS CORPORATION	O'DELL, BERTRAND W.	PL	WESTVACO A-1	No	No
R-45	ERIS	6700796	CABOT OIL & GAS CORPORATION	O'DELL, BERTRAND W.	PL	WESTVACO A-1	No	No
R-46	ERIS	2500018	DOMINION TRANSMISSION INC	HAYNES, MYRTLE	PL	10960	No	No
R-47	ERIS	2500011	DOMINION TRANSMISSION INC	GAULEY COAL LAND CO.	PL	10083	No	No
R-48	ERIS	2500011	DOMINION TRANSMISSION INC	GAULEY COAL LAND CO.	PL	10083	No	No
R-49	ERIS	2500018	DOMINION TRANSMISSION INC	HAYNES, MYRTLE	PL	10960	No	No
R-50	ERIS	6700197	OPERATOR UNKNOWN	GAULEY COAL	PL	10084	No	No
R-51	ERIS	6700796	CABOT OIL & GAS CORPORATION	O'DELL, BERTRAND W.	PL	WESTVACO A-1	No	No
R-52	ERIS	501951	CABOT OIL & GAS CORPORATION	ARK LAND COMPANY	NI	ALLEN&PRYOR 57R	No	No
R-53	ERIS	1900481	DOMINION TRANSMISSION INC	ROGERS, HUGH L.	PL	12767	No	No
R-54	ERIS	1900481	DOMINION TRANSMISSION INC	ROGERS, HUGH L.	PL	12767	No	No
R-55	ERIS	6700504	DOMINION TRANSMISSION INC	WESTVACO	PL	12606	No	Yes
R-56	ERIS	6700504	DOMINION TRANSMISSION INC	WESTVACO	PL	12606	No	Yes
R-57	ERIS	2500016	DOMINION TRANSMISSION INC	GAULEY COAL & LAND CO.	PL	10514	No	Yes

R-Number	Regulation Type	Permit Number	Responsible Party	Farm Name	Well Status	Well Number	Marcellus	In ZCC
R-58	ERIS	2500016	DOMINION TRANSMISSION INC	GAULEY COAL & LAND CO.	PL	10514	No	Yes
R-59	ERIS	2500031	BRC OPERATING COMPANY, LLC	MEADWESTVACO CORP.	FU	RUPERT 3	Yes	No
R-60	ERIS	2500031	BRC OPERATING COMPANY, LLC	MEADWESTVACO CORP.	FU	RUPERT 3	Yes	No
R-61	ERIS	4104203	PIONEER PETROLEUM, INC.	GUM, JOHN	AB	S. P. 1	No	No

*Only 23 of 28 total sites were prioritized and labeled due to their severity or proximity to the intake or ZCC.

Mining Outlets (HPU) – Figure A-7

R-Number	Regulation Type	Permit Number	Responsible Party	Type	In ZCC	Priority
R-62	HPU	WV1022610	EAGLE RIDGE DEVELOPMENT GROUP, LLC	STRM	Yes	0
R-63	HPU	WV1022610	EAGLE RIDGE DEVELOPMENT GROUP, LLC	STRM	Yes	0
R-64	HPU	WV1026542	EAGLE RIDGE DEVELOPMENT GROUP, LLC	STRM	Yes	0
R-65	HPU	WV1026542	EAGLE RIDGE DEVELOPMENT GROUP, LLC	STRM	Yes	0
R-66	HPU	WV1001302	T & L AUGERING CORP	OUTLT	Yes	2
R-67	HPU	WV1001302	T & L AUGERING CORP	OUTLT	Yes	2
R-68	HPU	WV1012380	N-F & G ENTERPRISES INC	OUTLT	Yes	2
R-69	HPU	WV1015079	MEADOW RIVER COAL CO	OUTLT	Yes	2
R-70	HPU	WVG013046	T & L AUGERING CORP	OUTLT	Yes	2
R-71	HPU	WVG013046	T & L AUGERING CORP	OUTLT	Yes	2
R-72	HPU	WVG013046	T & L AUGERING CORP	OUTLT	Yes	2
R-73	HPU	WVG013046	T & L AUGERING CORP	OUTLT	Yes	2
R-74	HPU	WVG013046	T & L AUGERING CORP	OUTLT	Yes	2
R-75	HPU	WVG013046	T & L AUGERING CORP	OUTLT	Yes	2
R-81	HPU	WV1015079	MEADOW RIVER COAL CO	OUTLT	No	2
R-76	HPU	WV1022431	ATLANTIC LEASECO, LLC	OUTLT	No	2
R-77	HPU	WV1022610	EAGLE RIDGE DEVELOPMENT GROUP, LLC	OUTLT	No	2
R-78	HPU	WV1022610	EAGLE RIDGE DEVELOPMENT GROUP, LLC	OUTLT	No	2
R-79	HPU	WV1022610	EAGLE RIDGE DEVELOPMENT GROUP, LLC	OUTLT	No	2
R-80	HPU	WV1022610	EAGLE RIDGE DEVELOPMENT GROUP, LLC	OUTLT	No	2

R-Number	Regulation Type	Permit Number	Responsible Party	Type	In ZCC	Priority
R-82	HPU	WV1026542	EAGLE RIDGE DEVELOPMENT GROUP, LLC	OUTLT	No	2
R-83	HPU	WV1026542	EAGLE RIDGE DEVELOPMENT GROUP, LLC	OUTLT	No	2
R-84	HPU	WV1026542	EAGLE RIDGE DEVELOPMENT GROUP, LLC	OUTLT	No	2
R-85	HPU	WV1026542	EAGLE RIDGE DEVELOPMENT GROUP, LLC	OUTLT	No	2
R-86	HPU	WV1026542	EAGLE RIDGE DEVELOPMENT GROUP, LLC	OUTLT	No	2
R-87	HPU	WVG013046	T & L AUGERING CORP	OUTLT	No	2
R-88	HPU	WV0061875	ROYAL SCOT MINERALS INC	STRM	No	0
R-89	HPU	WV0066150	GREEN VALLEY COAL COMPANY	STRM	No	0
R-90	HPU	WV0066150	GREEN VALLEY COAL COMPANY	STRM	No	0
R-91	HPU	WV0066150	GREEN VALLEY COAL COMPANY	STRM	No	0
R-92	HPU	WV0066150	GREEN VALLEY COAL COMPANY	STRM	No	0
R-93	HPU	WV0066150	GREEN VALLEY COAL COMPANY	STRM	No	0
R-94	HPU	WV0066150	GREEN VALLEY COAL COMPANY	STRM	No	0
R-95	HPU	WV0097390	HICA CORPORATION	STRM	No	0
R-96	HPU	WV0097390	HICA CORPORATION	STRM	No	0
R-97	HPU	WV0097390	HICA CORPORATION	STRM	No	0
R-98	HPU	WV0097390	HICA CORPORATION	STRM	No	0
R-99	HPU	WV1000268	GREEN VALLEY COAL COMPANY	STRM	No	0
R-100	HPU	WV1000268	GREEN VALLEY COAL COMPANY	STRM	No	0
R-101	HPU	WV1000268	GREEN VALLEY COAL COMPANY	STRM	No	0
R-102	HPU	WV1000268	GREEN VALLEY COAL COMPANY	STRM	No	0
R-103	HPU	WV1000268	GREEN VALLEY COAL COMPANY	STRM	No	0
R-104	HPU	WV1000268	GREEN VALLEY COAL COMPANY	STRM	No	0
R-105	HPU	WV1000942	QUINWOOD COAL LAND CO INC	STRM	No	0
R-106	HPU	WV1000942	QUINWOOD COAL LAND CO INC	STRM	No	0
R-107	HPU	WV1000942	QUINWOOD COAL LAND CO INC	STRM	No	0
R-108	HPU	WV1000942	QUINWOOD COAL LAND CO INC	STRM	No	0
R-109	HPU	WV1000942	QUINWOOD COAL LAND CO INC	STRM	No	0
R-110	HPU	WV1000942	QUINWOOD COAL LAND CO INC	STRM	No	0
R-111	HPU	WV1027964	WARRIOR ENERGY RESOURCES LLC	STRM	No	0

R-Number	Regulation Type	Permit Number	Responsible Party	Type	In ZCC	Priority
R-112	HPU	WV0066150	GREEN VALLEY COAL COMPANY	OUTLT	No	2
R-113	HPU	WV0066150	GREEN VALLEY COAL COMPANY	OUTLT	No	2
R-114	HPU	WV0097390	HICA CORPORATION	OUTLT	No	2
R-115	HPU	WV1000268	GREEN VALLEY COAL COMPANY	OUTLT	No	2
R-116	HPU	WV1000268	GREEN VALLEY COAL COMPANY	OUTLT	No	2
R-117	HPU	WV1000268	GREEN VALLEY COAL COMPANY	OUTLT	No	2
R-118	HPU	WV1000268	GREEN VALLEY COAL COMPANY	OUTLT	No	2
R-119	HPU	WV1000268	GREEN VALLEY COAL COMPANY	OUTLT	No	2
R-120	HPU	WV1000942	QUINWOOD COAL LAND CO INC	OUTLT	No	2
R-121	HPU	WV1000942	QUINWOOD COAL LAND CO INC	OUTLT	No	2
R-122	HPU	WV1000942	QUINWOOD COAL LAND CO INC	OUTLT	No	2
R-123	HPU	WV1000942	QUINWOOD COAL LAND CO INC	OUTLT	No	2
R-124	HPU	WV1001256	QUINWOOD COAL LAND CO INC	OUTLT	No	2
R-125	HPU	WV1001841	JOHN BROWN HARRIS INC	OUTLT	No	2
R-126	HPU	WV1015079	MEADOW RIVER COAL CO	OUTLT	No	2
R-127	HPU	WVG013048	HARRIS EXPORT COAL CORP	OUTLT	No	2
R-128	HPU	WVG013048	HARRIS EXPORT COAL CORP	OUTLT	No	2
R-129	HPU	WVG013048	HARRIS EXPORT COAL CORP	OUTLT	No	2
R-130	HPU	WVG013053	QUINWOOD COAL LAND CO INC	OUTLT	No	2
R-131	HPU	WV0061875	ROYAL SCOT MINERALS INC	STRM	No	0
R-132	HPU	WV0066150	GREEN VALLEY COAL COMPANY	STRM	No	0
R-133	HPU	WV1015281	MIDLAND TRAIL RESOURCES, LLC	STRM	No	0
R-134	HPU	WV1015281	MIDLAND TRAIL RESOURCES, LLC	STRM	No	0
R-135	HPU	WV1015281	MIDLAND TRAIL RESOURCES, LLC	STRM	No	0
R-136	HPU	WV1015281	MIDLAND TRAIL RESOURCES, LLC	STRM	No	0
R-137	HPU	WV1015281	MIDLAND TRAIL RESOURCES, LLC	STRM	No	0
R-138	HPU	WV1015281	MIDLAND TRAIL RESOURCES, LLC	STRM	No	0
R-139	HPU	WV0029190	JOHN BROWN HARRIS INC	OUTLT	No	2
R-140	HPU	WV0066150	GREEN VALLEY COAL COMPANY	OUTLT	No	2
R-141	HPU	WV0066150	GREEN VALLEY COAL COMPANY	OUTLT	No	2

R-Number	Regulation Type	Permit Number	Responsible Party	Type	In ZCC	Priority
R-142	HPU	WV0066150	GREEN VALLEY COAL COMPANY	OUTLT	No	2
R-143	HPU	WV0066150	GREEN VALLEY COAL COMPANY	OUTLT	No	2
R-144	HPU	WV0066150	GREEN VALLEY COAL COMPANY	OUTLT	No	2
R-145	HPU	WV0092011	H & D COAL CO	OUTLT	No	2
R-146	HPU	WV0092011	H & D COAL CO	OUTLT	No	2
R-147	HPU	WV1000268	GREEN VALLEY COAL COMPANY	OUTLT	No	2
R-148	HPU	WV1000268	GREEN VALLEY COAL COMPANY	OUTLT	No	2
R-149	HPU	WV1000942	QUINWOOD COAL LAND CO INC	OUTLT	No	2
R-150	HPU	WV1000942	QUINWOOD COAL LAND CO INC	OUTLT	No	2
R-151	HPU	WV1000942	QUINWOOD COAL LAND CO INC	OUTLT	No	2
R-152	HPU	WV1000942	QUINWOOD COAL LAND CO INC	OUTLT	No	2
R-153	HPU	WV1000942	QUINWOOD COAL LAND CO INC	OUTLT	No	2
R-154	HPU	WV1000942	QUINWOOD COAL LAND CO INC	OUTLT	No	2
R-155	HPU	WV1000942	QUINWOOD COAL LAND CO INC	OUTLT	No	2
R-156	HPU	WV1000942	QUINWOOD COAL LAND CO INC	OUTLT	No	2
R-157	HPU	WV1000942	QUINWOOD COAL LAND CO INC	OUTLT	No	2
R-158	HPU	WV1000942	QUINWOOD COAL LAND CO INC	OUTLT	No	2
R-159	HPU	WV1000942	QUINWOOD COAL LAND CO INC	OUTLT	No	2
R-160	HPU	WV1000942	QUINWOOD COAL LAND CO INC	OUTLT	No	2
R-161	HPU	WV1000977	H & D COAL CO	OUTLT	No	2
R-162	HPU	WV1001256	QUINWOOD COAL LAND CO INC	OUTLT	No	2
R-163	HPU	WV1001841	JOHN BROWN HARRIS INC	OUTLT	No	2
R-164	HPU	WV1001850	RUPERT FEED & SUPPLY CO INC	OUTLT	No	2
R-165	HPU	WV1001850	RUPERT FEED & SUPPLY CO INC	OUTLT	No	2
R-166	HPU	WV1001850	RUPERT FEED & SUPPLY CO INC	OUTLT	No	2
R-167	HPU	WV1001850	RUPERT FEED & SUPPLY CO INC	OUTLT	No	2
R-168	HPU	WV1012983	NEW RIVER MINERALS RESOURCES	OUTLT	No	2
R-169	HPU	WV1015281	MIDLAND TRAIL RESOURCES, LLC	OUTLT	No	2
R-170	HPU	WV1015281	MIDLAND TRAIL RESOURCES, LLC	OUTLT	No	2
R-171	HPU	WV1015281	MIDLAND TRAIL RESOURCES, LLC	OUTLT	No	2

R-Number	Regulation Type	Permit Number	Responsible Party	Type	In ZCC	Priority
R-172	HPU	WV1027964	WARRIOR ENERGY RESOURCES LLC	OUTLT	No	2
R-173	HPU	WV1027964	WARRIOR ENERGY RESOURCES LLC	OUTLT	No	2
R-174	HPU	WVG013053	QUINWOOD COAL LAND CO INC	OUTLT	No	2

*Only 113 of 733 total sites were prioritized and labeled due to their severity or proximity to the intake or ZCC.

Leaking Underground Storage Tanks (LUST) – Figure A-6

R-Number	WV ID	Leak Number	Column1	Cleanup Completed	Facility Name
R-175	1301212	03-012	03/11/2003	No	LITTLE GENERAL STORE #2090
R-176	1301212	05-057	10/11/2005	05/19/2008	LITTLE GENERAL STORE #2090
R-177	1301286	92-119-L13	05/26/1992	No	K & S MINI MART
R-178	1301273	93-286	09/14/1993	No	R & C SERVICE CENTER
R-179	1301273	13-009	02/13/2013	No	R & C SERVICE CENTER
R-180	1301256	96-001	01/03/1996	02/23/1996	RUPERT SERVICE CENTER
R-181	1308331	00-069	08/17/2000	07/23/2008	FORMER CHEVRON STATION
R-182	1301306	11-042	10/20/2011	No	CRAWLEY SUB STA 09132

NPDES Permits (OWRNPDES_Outlets) – Figure A-6

R-Number	Regulation Type	Permit Number	Responsible Party	Facility Name	Permit Type	In ZCC	Priority
R-183	OWRNPDES	WVG611195	AMERICAN TIMBER MARKETING GROUP, LLC	AMERICAN TIMBER MARKETING GROUP LLC	Storm Water Industrial (GP)	Yes	0
R-184	OWRNPDES	WVG640071	WILDERNESS PSD	Wilderness PSD	Water Treatment Plant (GP)	Yes	0
R-185	OWRNPDES	050004	GRIMMITT, MICHAEL LEWIS	NA	Septic Seal Permit	Yes	0
R-186	OWRNPDES	043480	GRIMMETT, MICHAEL & CHRISTINA	NA	Septic Seal Permit	Yes	0
R-187	OWRNPDES	040497	ARNETT, KENNETH & DENISE	NA	Septic Seal Permit	Yes	0
R-188	OWRNPDES	042956	KEENEY, JOHN	NA	Septic Seal Permit	No	0
R-189	OWRNPDES	046165	PARRISH, ROBERT	NA	Septic Seal Permit	No	0
R-190	OWRNPDES	WVG610922	REYNOLDS OIL CO	Reynolds Oil Company -- Rainelle Plant	Storm Water Industrial (GP)	No	0
R-191	OWRNPDES	WVG640015	RAINELLE TOWN OF	Rainelle Water Department	Water Treatment Plant (GP)	No	0

R-Number	Regulation Type	Permit Number	Responsible Party	Facility Name	Permit Type	In ZCC	Priority
R-192	OWRNPDES	WV0040525	GREENBRIER CNTY PSD NO 2	Greenbrier County Public Service District #2	Ind POTW	No	1
R-193	OWRNPDES	WVG610538	MEADOW RIVER HARDWOOD LUMBER	MEADOW RIVER HARDWOOD LUMBER	Storm Water Industrial (GP)	No	0
R-194	OWRNPDES	WVR106860	RAINELLE TOWN OF	Miscellaneous Water Systems Upgrade	Storm Water Construction (NOI)	No	0
R-195	OWRNPDES	044971	MCGRAW, BILLY & MARTHA	NA	Septic Seal Permit	No	0
R-196	OWRNPDES	051086	JONES, LEWIS B	NA	Septic Seal Permit	No	0
R-197	OWRNPDES	WVG611065	L & T CONSTRUCTION, INC.	L&T Construction, Inc.	Storm Water Industrial (GP)	No	0
R-198	OWRNPDES	WVG610351	CALLISON TRUCKING CO INC	CALLISON TRUCKING CO INC	Storm Water Industrial (GP)	No	0
R-199	OWRNPDES	046737	CROOKSHANKS, ALICE RUTH	NA	Septic Seal Permit	No	0
R-200	OWRNPDES	041291	TREACY, JAMES & MARGARET	NA	Septic Seal Permit	No	0
R-201	OWRNPDES	1142-07-067	MEADOWS, FRANCES	The Farmer's Table LLC (Frances & Beverly Meadows)	5W32 - Septic Systems(Drain Field Disposal Mthd)	No	0
R-202	OWRNPDES	043666	LIEGEY, DAN	NA	Septic Seal Permit	No	0
R-203	OWRNPDES	043833	ADAMS, TIMOTHY S	NA	Septic Seal Permit	No	0
R-204	OWRNPDES	049147	MARTIN, ARNOLD & TILDA	NA	Septic Seal Permit	No	0
R-205	OWRNPDES	050702	RODGERS, RUSSELL	NA	Septic Seal Permit	No	0
R-206	OWRNPDES	046735	HIGGINBOTHAM, GEORGE & KIMBERLY	NA	Septic Seal Permit	No	0
R-207	OWRNPDES	049810	OSBORNE, GARY	NA	Septic Seal Permit	No	0
R-208	OWRNPDES	043668	LIEGEY, DAN	NA	Septic Seal Permit	No	0
R-209	OWRNPDES	044561	DUFFENBARGER, CHRISTINE & TRAVIS	NA	Septic Seal Permit	No	0
R-210	OWRNPDES	WVR105034	GREENBRIER CO BOARD OF ED	RAINELLE ELEMENTARY SCHOOL	Storm Water Construction (GP)	No	0
R-211	OWRNPDES	050920	SIMMS, CHRIS	NA	Septic Seal Permit	No	0
R-212	OWRNPDES	043667	LIEGEY, DAN	NA	Septic Seal Permit	No	0
R-213	OWRNPDES	049321	MINEAR, STEPHEN	NA	Septic Seal Permit	No	0
R-214	OWRNPDES	WV0105392	BURNS MOTOR FREIGHT INC	Burns Motor Freight, Inc.	Individual	No	0
R-215	OWRNPDES	WVG550578	REYNOLDS OIL CO	Sam Black Quick Stop	Sewage General	No	0

R-Number	Regulation Type	Permit Number	Responsible Party	Facility Name	Permit Type	In ZCC	Priority
R-216	OWRNPDES	WVSG20035	OSBORNE'S SEPTIC & DRAIN CLEANING	Osborne's Septic & Drain Cleaning	Sludge/Septic POTW Disposal (GP)	No	0
R-217	OWRNPDES	WVSG20060	PARKER, CHARLES	Charlie Parker Sanitation	Sludge/Septic POTW Disposal (GP)	No	0

*Only 35 of 66 total sites were prioritized and labeled due to their severity or proximity to the intake or ZCC.

Special Reclamation-Bond Forfeiture Sites (SPREC) – Figure A-6

R-Number	Regulation Type	Permit Number	Company	Date Revoked	In ZCC
R-218	SPREC	P-3060-86	VERNON CRITCHLEY	1/1/1990	No
R-219	SPREC	U-132-83	N & F MINING CO.	7/20/1993	No
R-220	SPREC	217-73	JENKINS INDUSTRIES	1/1/1982	No
R-221	SPREC	H-134	JENKINS INDUSTRIES	8/1/1980	No
R-222	SPREC	214-75	JENKINS INDUSTRIES	6/1/1980	No
R-223	SPREC	UO-108	LYNN DALE COAL CO.	1/20/1988	No
R-224	SPREC	206-75	JENKINS INDUSTRIES	6/1/1980	No
R-225	SPREC	24-75	JENKINS INDUSTRIES	6/1/1980	No
R-226	SPREC	S-3033-87	H & D COAL CO.	4/28/1993	No
R-227	SPREC	UO-324	WV MOUNTAIN RESOURCES	2/1/1985	No
R-228	SPREC	D-10433	WEST VIRGINIA MT. RES. ASSO.		No
R-229	SPREC	S-126-82	CLASSIC RES., INC.	5/12/1986	No
R-230	SPREC	U-69-85	H & D COAL COMPANY	7/2/1993	No
R-231	SPREC	H-384	ROYAL SCOT MINERALS, INC.	4/27/2000	No
R-232	SPREC	S-3055-88	DOUBLE N MINING CO.	8/9/1994	No
R-233	SPREC	R-3-84	RAINELLE LAND DEV., INC.	11/13/1987	No

*Only 16 of 59 total sites were prioritized and labeled due to their severity or proximity to the intake or ZCC.

USEPA Regulated Sites (Superfund_RCRA) – Figure A-8

R-Number	Regulation Type	Registry	Registry ID	Primary Site Name	In ZCC
R-234	Superfund_RCRA	110013000000	110012685870	WILDERNESS PSD	Yes
R-235	Superfund_RCRA	110023000000	110023140251	AMERICAN TIMBER MARKETING GROUP	Yes

R-Number	Regulation Type	Registry	Registry ID	Primary Site Name	In ZCC
R-236	Superfund_RCRA	110055000000	110054873384	WVDOH LOOKOUT HDQS	Yes
R-237	Superfund_RCRA	110055000000	110054965169	WILDERNESS PSD	Yes
R-238	Superfund_RCRA	110055000000	110055011927	RUSSELLVILLE BRIDGE (S313-2-0.	Yes
R-239	Superfund_RCRA	110055000000	110055014791	RUNA ROAD, S334-24-0.00	Yes
R-240	Superfund_RCRA	110005000000	110005270447	MCCLUNG HEATING & COOLING	No
R-241	Superfund_RCRA	110006000000	110005551107	REYNOLDS OIL COMPANY -- RAINELLE	No
R-242	Superfund_RCRA	110006000000	110005558583	CENTER CHEVROLET	No
R-243	Superfund_RCRA	110006000000	110005559822	WESTERN AUTO	No
R-244	Superfund_RCRA	110006000000	110005567467	C&N SERVICE CENTER	No
R-245	Superfund_RCRA	110006000000	110006179580	GREENBRIER COUNTY PUBLIC SERVICE DISTRICT NO 2	No
R-246	Superfund_RCRA	110007000000	110006832320	DODSON HAGER FORD SALES INC	No
R-247	Superfund_RCRA	110008000000	110007877039	GEORGIA-PACIFIC CORP RAINELLE WV	No
R-248	Superfund_RCRA	110010000000	110010411287	MCKENZIE TIPPLE	No
R-249	Superfund_RCRA	110011000000	110010868971	RAINELLE WATER DEPARTMENT	No
R-250	Superfund_RCRA	110033000000	110032962186	KROGER STORE #734	No
R-251	Superfund_RCRA	110037000000	110037450674	MARTINS AUTO BODY REPAIR	No
R-252	Superfund_RCRA	110040000000	110039949483	GREENBRIER CO PSD NO. 2	No
R-253	Superfund_RCRA	110041000000	110041430323	RAINELLE YARD	No
R-254	Superfund_RCRA	110046000000	110045519836	WATER DEPARTMENT	No
R-255	Superfund_RCRA	110055000000	110054874061	K & G TIRE MART	No
R-256	Superfund_RCRA	110055000000	110054981123	GREENBRIER AVE BRIDGE	No
R-257	Superfund_RCRA	110055000000	110055015727	MISCELLANEOUS WATER SYSTEM IMP	No
R-258	Superfund_RCRA	110055000000	110055067608	RITE AID #121	No
R-259	Superfund_RCRA	110006000000	110005551429	USARC RAINELLE BMA 107	No
R-260	Superfund_RCRA	110006000000	110005552561	PAULS AUTO SALES	No
R-261	Superfund_RCRA	110006000000	110005560384	FISHER AUTO PARTS INC	No
R-262	Superfund_RCRA	110006000000	110005562541	SCOTT RHODES SERVICE	No
R-263	Superfund_RCRA	110006000000	110005568288	NAPA AUTO PARTS	No
R-264	Superfund_RCRA	110006000000	110005570934	USARC RAINELLE	No
R-265	Superfund_RCRA	110006000000	110005574119	APCO RAINELLE SERVICE CENTER	No

R-Number	Regulation Type	Registry	Registry ID	Primary Site Name	In ZCC
R-266	Superfund_RCRA	110006000000	110006436632	CSX TRANSPORTATION INC	No
R-267	Superfund_RCRA	110008000000	110007871348	SPECIAL T BODY SHOP	No
R-268	Superfund_RCRA	110008000000	110007875148	THE LADY H COAL CO.	No
R-269	Superfund_RCRA	110008000000	110007878092	AT & T LONG LINES-EQUIP ENGR RAINELLE	No
R-270	Superfund_RCRA	110011000000	110010850828	CALLISON TRUCKING CO INC	No
R-271	Superfund_RCRA	110011000000	110010862566	GREEN VALLEY COAL COMPANY	No
R-272	Superfund_RCRA	110013000000	110012816774	RICH OIL #3963	No
R-273	Superfund_RCRA	110013000000	110013400916	L&T CONSTRUCTION, INC. DBA-MOU	No
R-274	Superfund_RCRA	110021000000	110020741287	MEADOW RIVER HARDWOOD LUMBER CO	No
R-275	Superfund_RCRA	110022000000	110022300623	RAINELLE ELEM & JR HIGH SCHOOL	No
R-276	Superfund_RCRA	110023000000	110023125312	ONE STOP #126	No
R-277	Superfund_RCRA	110038000000	110037958804	K&S MINI MART	No
R-278	Superfund_RCRA	110043000000	110043309522	BROWNS AUTO REPAIR	No
R-279	Superfund_RCRA	110046000000	110045960251	A.L.L. CONSTRUCTION CHARMCO WA	No
R-280	Superfund_RCRA	110046000000	110046128766	RAINELLE ELEMENTARY SCHOOL	No
R-281	Superfund_RCRA	110046000000	110046139488	WATER EXT PROJECT	No
R-282	Superfund_RCRA	110046000000	110046143197	ADDITIONS & RENOVATIONS TO	No
R-283	Superfund_RCRA	110055000000	110054873080	R & C SERVICE CENTER - STATION	No
R-284	Superfund_RCRA	110055000000	110054876103	E L HAMPTON TRUCKING	No
R-285	Superfund_RCRA	110055000000	110054876112	GREENBRIER SMOKELESS COAL	No
R-286	Superfund_RCRA	110055000000	110054877987	MAIN STREET AUTO REPAIR & DETAILING	No
R-287	Superfund_RCRA	110055000000	110054878012	R & C SERVICE CENTER - SHOP	No
R-288	Superfund_RCRA	110055000000	110054916338	GREENBRIER WEST HIGH SCHOOL	No
R-289	Superfund_RCRA	110055000000	110054969780	LESLIE (NELSON) DRAINING PORTA	No
R-290	Superfund_RCRA	110055000000	110054987564	H & D COAL COMPANY/DOUBLE	No
R-291	Superfund_RCRA	110055000000	110054992601	CHARMCO MOUNTAIN TRUCK LANE	No

*Only 58 of 103 total sites were prioritized and labeled due to their severity or proximity to the intake or ZCC.

Volunteer Remediation Sites – Figure A-8

R-Number	Facility Name	Project Name	Issue Date	Project ID
R-292	Sam Black Church Exxon	Sam Black Church Exxon (VRP 04373)	2001/08/06	795
R-293	Speedway - Rainelle	Speedway - Rainelle (VRP 08534)	2007/12/05	9242

Coal Impoundments and Refuse Structures – Figure A-8

R-Number	Facility Name	Company	Size (acres)
R-294	NA	GREEN VALLEY COAL COMPANY	42.07
R-295	NA	RAINELLE LAND DEV, CORP	15.45
R-296	CLEARCO REFUSE AREA	BROOKS RUN MINING COMPANY, LLC	9.47
R-297	MOUNTAINEER NO. 1 REFUSE DISP	GREENBRIER SMOKELESS COAL MIN*	40.78
R-298	BUCK LILLY HOLLOW CR IMP.	LECKIE SMOKELESS COAL CO.	27.51

APPENDIX B. EARLY WARNING MONITORING SYSTEM FORMS

Form B-Proposed Early Warning Monitoring Systems- Surface Water Source

Wilderness PSD

Primary Surface Water Source: Meadow River

There are many possible solutions for designing and installing an early warning monitoring system. Over time, this technology changes and improves and it is difficult to determine the type of equipment that will be useful and effective in the long term. This plan is a proposed system that would work for Wilderness PSD using current technology and the current plant and intake configuration.

Wilderness PSD regularly accesses two different raw water sources: Anglins Creek and the Meadow River. These proposed plans focus on the Meadow River, which the operator has identified as their primary source. The water treatment plant is located very close to the intake pipe, so two of these proposals suggest that the monitoring equipment be located in the treatment plant itself.

B-1. YSI EXO 2 Monitoring System Proposal
Describe the type of early warning detection equipment that could be installed, including the design.
The YSI EXO 2 Multiport Sonde can accommodate 6 different sensors and has an automatic wiper mechanism to remove biofouling from the sensor tips, which reduces maintenance time. The sonde is built to be resilient and low maintenance, and is capable of providing online water quality monitoring that can be transmitted real time to a designated PC or website that can be accessed by any designated user. The sonde can hold up to 6 sensors, but this plan recommends 4 of the more basic sensors that would be sufficient to detect any sudden shifts in water quality in the Meadow River. These sensors would include: conductivity/temperature, optical dissolved oxygen, pH, and fluorescent dissolved organic matter (fDOM). The fDOM sensor could potentially detect petroleum products in the water but is not entirely reliable for this purpose. At this time, YSI does not make a sensor for petroleum products for the EXO 2 but likely will in the future, at which time it is recommended that the utility purchase it. Other sensors could be purchased in the future as well if deemed necessary by the utility.
Where would the equipment be located?
The sonde would be attached to the intake pipe itself, which extends into the Meadow River. This would provide a stable foundation for the equipment and also ensure that the device is able to sample the water that is actually entering the actual intake pipe and not missing potential contaminants because it is located on the wrong side of the stream or too far from the intake. The suggested method of mounting the sonde involves drilling holes in a PVC pipe, capping the end, inserting the sonde and attaching to the intake pipe structure using brackets or chains. This will protect the sensor from debris and hide it from view somewhat. The sonde would be hardwired to the YSI Storm 3 data analysis/telemetry system. Since the Wilderness PSD water treatment plant is so close to the intake, the Storm 3 could likely be located in the plant itself. If this was not possible and it needed to be located on the bank closer to the intake, the unit is contained in a waterproof case and comes with a solar photovoltaic panel capable of powering both the data analysis unit and the

sonde, so long as the sonde is hardwired to the Storm 3. The device can be battery powered as well if this is not an option.
What would the maintenance plan for the monitoring equipment entail?
The maintenance plan for the system would involve replacing the dissolved oxygen sensor cap, replacing the pH electrode cap, and purchasing pH, turbidity, and conductivity calibration solution on a yearly basis. The sonde itself is designed to last from 5-10 years and should be inspected and calibrated once a month. In addition, there is a recurring yearly fee associated with the real-time data/telemetry package for managing the website and data analysis.
Describe the proposed sampling plan at the monitoring site.
The sonde can be programmed to take regular measurements at any intervals defined by the operator or user. These measurements can also be taken in bursts, averaged over a period of time, or modified automatically as water quality levels change. Data is stored in the Storm 3 and transmitted to the plant computer as it is recorded. This information can be transmitted wirelessly via a cellular modem. The cellular transmitter is powerful enough to work even in areas with poor cell reception.
Describe the proposed procedures for data management and analysis.
The Storm 3 package includes data management software that can generate data reports and presentations and allow the user to modify and adjust sampling schedules remotely from the plant. The sonde can be programmed to alert the user when any of the water quality parameters exceeds a user-defined level. This will allow the operator to program the system to notify them when their previously observed baseline conditions are exceeded in time for them to shut down the pumps and close off the intake. The operator can receive alerts via text message and email at the treatment plant computer or any designated cell phone.

B-2. Hach sc1000 Monitoring System Proposal
Describe the type of early warning detection equipment that could be installed, including the design.
The Hach sc1000 online monitoring system includes a controller, back panel, display module, and trough. Raw water is pumped into the trough from the source where it can be sampled in real time. The probe module can accommodate up to 6 sensors, which means it can monitor up to 6 parameters at once. This plan suggests the following sensors: conductivity, pH, turbidity, and dissolved oxygen. Hach can also supply a sensor to detect oil in water, which would cost an additional $18,414.00 and would possibly be a good investment for any water system if sufficient funds were available. This sensor is not included in the quoted capital cost. There are several other probes for other parameters that are available from Hach, and these could be purchased as deemed necessary by the utility.

Where would the equipment be located?
The sc1000 Controller, back panel, and trough would be located in the Wilderness treatment plant itself. A small diameter line would run out from the plant the length of the intake pipe to pull raw water back to the controller where it would flow into the trough for sampling. The closer this sampling line can be to the actual intake, the more accurately it will reflect the raw water that is actually entering the plant. This option would require the utility to purchase a line or hose long enough to reach the intake pipe and a small pump. The line and pump could be fairly low- tech and inexpensive, as the sc1000 only requires a minimum of 900 mL/min. of flow. The controller will be equipped with the MODBUS advanced communications/networking unit, which can transmit readings in real time directly to the SCADA system in the treatment plant to alert the operators in any change in baseline water quality. The sc1000 can either be hardwired to the computer at the treatment plant or it can use a cellular modem to transmit the data if there is sufficient cellular signal. Since the system would be located in the plant in this case, this would not be necessary.
What would the maintenance plan for the monitoring equipment entail?
The maintenance plan for the system would entail a yearly maintenance contract with the manufacturer. A Hach Service Representative would regularly service the monitoring equipment. This service would take care of all parts, labor, and preventative maintenance and would include 2-3 scheduled maintenance visits per year.
Describe the proposed sampling plan at the monitoring site.
The sc1000 monitors the quality of water flowing through the trough in real time, and can transmit this data to the plant computer as it is collected. The actual timing of the sampling plan could be determined by the utility.
Describe the proposed procedures for data management and analysis.
It is recommended that the utility purchase the Hach Universal Data Gateway software, which would help to process and analyze the incoming information into easily interpreted reports. The price of this software is included in the rough capital cost.

B-3. Real Tech Full Scanning UV-VIS Monitoring System
Describe the type of early warning detection equipment that could be installed, including the design.
The Real Tech Full Scanning UV-VIS monitoring system provides full ultraviolet/visible scanning for specific parameters and event detection. The included PC Controller is pre-loaded with the software needed to store and process this information to establish a “normal” or “baseline” set of conditions for the raw water source. In addition to the UV-VIS sensors, the system can accommodate up to 8 additional sensors that are available from a third party and priced separately. This plan includes pricing and details for a system equipped to measure conductivity, pH, temperature, and dissolved oxygen. Other additional sensors could be purchased and added if deemed necessary by the utility.

Where would the equipment be located?
In the case of Wilderness PSD, the UV-VIS Full Monitoring System could be located in the water treatment plant since it is so close to the raw water intake. A small-diameter line or hose would run from the treatment plant to the intake pipe to pull raw water back to the controller where it would flow into the unit for sampling. The closer the end of the sampling line can be to the actual intake, the more accurately it will reflect the raw water that is actually entering the plant. This option would require the utility to purchase enough line to reach the intake as well as a small pump. The sampling line and pump could be fairly small and inexpensive, as the system only requires a minimum of 300-800 mL/min. of flow. The system also includes the Real Pump Clean System, which provides flow and automatic chemical cleaning of the sensors and reduces maintenance time. This system would require a reliable electrical source, but the intakes are located adjacent to the treatment plant at Wilderness so electrical supply is not an issue.
What would the maintenance plan for the monitoring equipment entail?
The maintenance plan for the system would require about 2 hrs/month for scheduled maintenance tasks. It is also recommended that a monthly laboratory reference sample is taken to effectively calibrate the sensors. The Smart-Sense Web Monitoring Service package costs an additional $499/yr., but provides additional support and remote accessibility by Real Tech, and it is recommended. The Deuterium and Tungsten lamps would also need to be replaced every six months at a cost of $740.
Describe the proposed sampling plan at the monitoring site.
The Full Scanning UV-VIS system continuously monitors raw water as it is pumped through the unit, and is capable of establishing baseline conditions that account for seasonal variability, which can help to reduce false alarms.
Describe the proposed procedures for data management and analysis.
The Real Tech monitoring system is capable of communicating with the treatment plant computer via Modbus, Ethernet, USB, or cell modem. It can be integrated with the treatment plant's SCADA system to provide real-time information about conditions at the intake and provides full remote monitoring. It is also recommended that the utility take advantage of the Smart-Sense Web Monitoring service offered by Real-Tech to analyze and interpret data taken by the monitoring system. This consultation service requires an additional service fee, which is included in this quote.

APPENDIX C. COMMUNICATION PLAN TEMPLATE

Wilderness PSD

PWSID: WV3303405

Administrative Contact: John Scott Rader

Contact Phone Number: 304-872-5525

Contact Email Address: scott.wpsd@gmail.com

Plan Developed: May 2016

ACKNOWLEDGMENTS:

This plan was developed by Wilderness PSD to meet certain requirements of the Source Water and Assessment Protection Program (SWAPP) and the State of West Virginia, as directed by state laws and regulations.

TABLE OF CONTENTS

INTRODUCTION

Legislative Rule 64CSR3 requires public water systems to develop a Communication Plan that documents how public water suppliers, working in concert with state and local emergency response agencies, shall notify state and local health agencies and the public in the event of a spill or contamination event that poses a potential threat to public health and safety. The plan must indicate how the public water supplier will provide updated information, with an initial notification to the public to occur no later than thirty minutes after the supplier becomes aware that the spill, release or potential contamination of the public water system poses a potential threat to public health and safety.

The public water system has responsibility to communicate to the public, as well as to state and local health agencies. This plan is intended to comply with the requirements of Legislative Rule 64CSR3, and other state and federal regulations.

TIERS REPORTING SYSTEM

This water system has elected to use the *Tiered Incident / Event Reporting System* (TIERS) for communicating with the public, agencies, the media, and other entities in the event of a spill or other incident that may threaten water quality. TIERS provides a multi-level notification framework, which escalates the communicated threat level commensurate with the drinking water system risks associated with a particular contamination incident or event. TIERS also includes a procedural flow chart illustrating key incident response communication functions and how they interface with overall event response / incident management actions. Finally, TIERS identifies the roles and responsibilities for key people involved in risk response, public notification, news media and other communication.

TIERS provides an easy-to-remember five-tiered **A-B-C-D-E** risk-based incident response communication format, as described below. Table 1 provides also associated risk levels.

A = **A**nnouncement. The water system is issuing an announcement to the public and public agencies about an incident or event that may pose a threat to water quality. Additional information will be provided as it becomes available. As always, if water system customers notice anything unusual about their water, they should contact the water system

B = **B**oil Water Advisory. A boil water advisory has been issued by the water system. Customers may use the water for showering, bathing, and other non-potable uses, but should boil water used for drinking or cooking.

C = **C**annot Drink. The water system asks that users not drink or cook with the water at this time. Non-potable uses, such as showering, bathing, cleaning, and outdoor uses are not affected.

D = **D**o Not Use. An incident or event has occurred affecting nearly all uses of the water. Do not use the water for drinking, cooking, showering, bathing, cleaning, or other tasks where water can come in contact with your skin. Water can be used for flushing commodes and fire protection.

E = **E**mergency. Water cannot be used for any reason.

Tier	Tier Category	Risk Level	Tier Summary
A	**A**nnouncement	Low	The water system is issuing an announcement to the public and public agencies about an incident or event that could pose a threat to public health and safety. Additional information will be provided as it becomes available.
B	**B**oil Water Advisory	Moderate	Water system users are advised to boil any water to be used for drinking or cooking, due to possible microbial contamination. The system operator will notify users when the boil water advisory is lifted.

C	**C**annot Drink	High	System users should not drink or cook with the water until further notice. The water can still be used for showering, bathing, cleaning, and other tasks.
D	**D**o Not Use	Very High	The water should only be used for flushing commodes and fire protection until further notice. More information on this notice will be provided as soon as it is available.
E	**E**mergency	Extremely High	The water should not be used for any purpose until further notice. More information on this notice will be provided as soon as it is available.

COMMUNICATION TEAM

The Communication Team for the water system is listed in the table below, along with key roles. In the event of a spill or other incident that may affect water quality, the water system spokesperson will provide initial information, until the team assembles (if necessary) to provide follow-up communication.

Water system communication team members, organizations, and roles.

Team Member Name	Organization	Phone	Email	Role
Scott Rader	Wilderness PSD	304-872-5225	scott.wpsd@gmail.com	Primary Spokesperson
Debbie Gilbert	Wilderness PSD	304-872-1598	debbie.gilbert@wildernesspsd.com	Secondary Spokesperson
Pat McCutcheon	Wilderness PSD	304-651-1599	water.wpsd@gmail.com	Member
Director	Nicholas County Emergency Management	304-872-7892	-	Member

In the event of a spill, release, or other incident that may threaten water quality, members of the team who are available will coordinate with the management staff of the local water supplier to:

- Collect information needed to investigate, analyze, and characterize the incident/event
- Provide information to the management staff, so they can decide how to respond
- Assist the management staff in handling event response and communication duties
- Coordinate fully and seamlessly with the management staff to ensure response effectiveness

COMMUNICATION TEAM DUTIES

The communication team will be responsible for working cooperatively with the management staff and state and local emergency response agencies to notify local health agencies and the public of the initial spill or contamination event. The team will also provide updated information related to any contamination or impairment of the source water supply or the system's drinking water supply.

According to Legislative Rule 64CSR3, the initial notification to the public will occur no later than thirty minutes after the public water system becomes aware that the spill, release or potential contamination of the public water system poses a potential threat to public health and safety.

As part of the group implementing the Source Water Protection Plan, team members are expected to be familiar with the plan, including incident/event response and communication tasks. Specifically, team members should:

- Be knowledgeable on elements of the Source Water Protection Plan and Communication Plan
- Attend team meetings to ensure up-to-date knowledge of the system and its functions
- Participate in periodic exercises that “game out” incident response and communication tasks

- Help to educate local officials, the media, and others on source water protection
- Cooperate with water supplier efforts to coordinate incident response communication
- Be prepared to respond to requests for field investigations of reported incidents
- Not speak on behalf of the water supplier unless designated as the system's spokesperson

The primary spokesperson will be responsible for speaking on behalf of the water system to local agencies, the public, and the news media. The spokesperson should work with the management staff and the team to ensure that all communication is clear, accurate, timely, and consistent. The spokesperson may authorize and/or direct others to issue news releases or other information that has been approved by the system's management staff. The spokesperson is expected to be on call immediately when an incident or event which may threaten water quality occurs. The spokesperson will perform the following tasks in the event of a spill, release, or other event that threatens water quality:

- Announce which risk level (A, B, C, D, or E) will apply to the public notifications that are issued
- Issue news releases, updates, and other information regarding the incident/event
- Use the news media, email, social media, and other appropriate information venues
- Ensure that news releases are sent to local health agencies and the public
- Respond to questions from the news media and others regarding the incident/event
- Appear at news conferences and interviews to explain incident response, etc.

INCIDENT / EVENT COMMUNICATION PROCEDURE

The flow chart in this section illustrates how the water system will respond when it receives a report that a spill, release, or other contamination event may have occurred. Key elements of the flow chart are described below.

Communication with agencies, the public, and the media during threat incidents

Upon initial notification of the incident/event, system managers and staff will collect information and verify the need for further investigation. Only properly trained personnel will perform onsite investigations if permitted by emergency responders. If further investigation is warranted, and the initial facts support it, the water system spokesperson will issue a public communication statement consistent with the threat level. In addition, water system personnel and partners will be dispatched to conduct reconnaissance, a threat assessment, and a threat characterization, if present. This work may include:

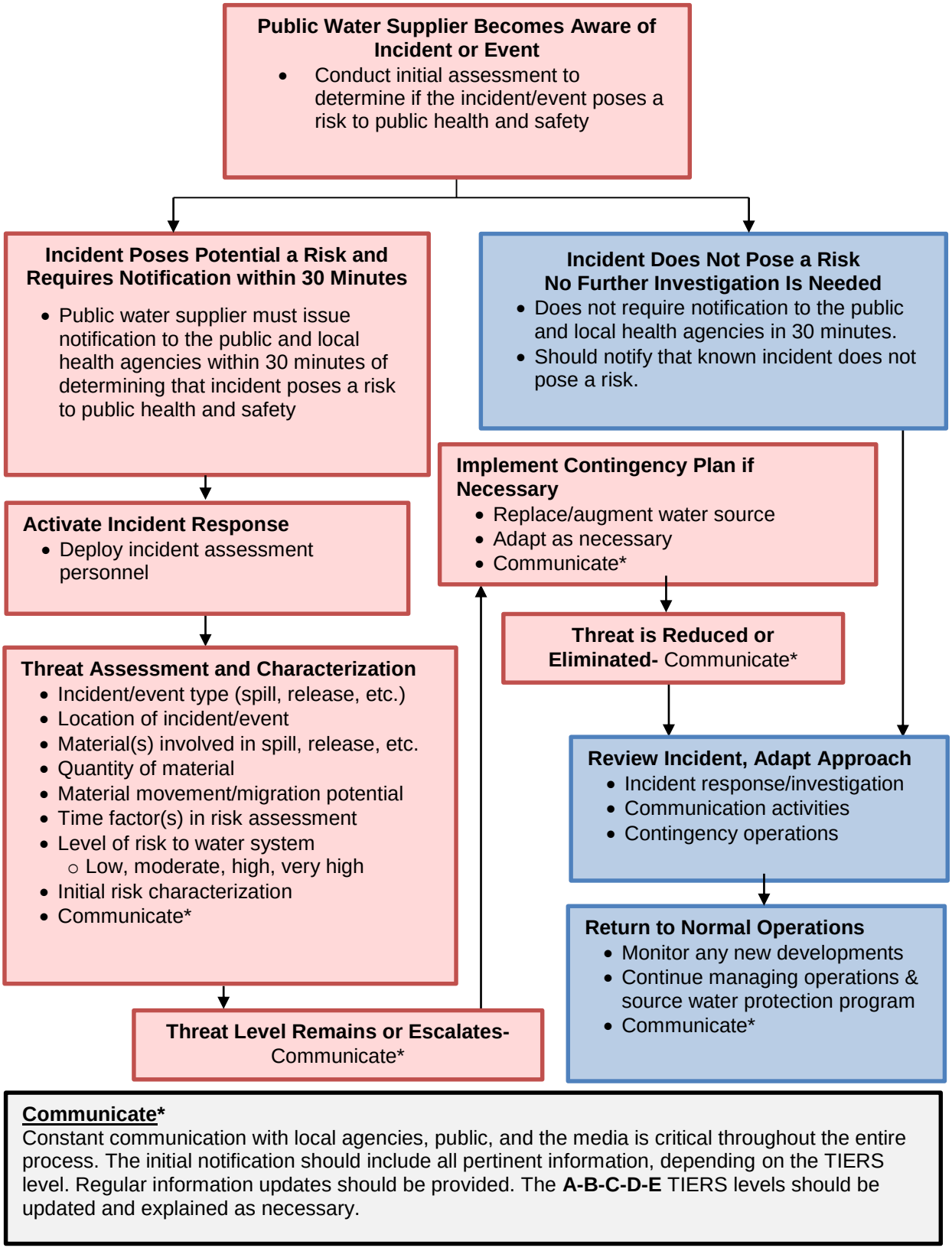
- Verification of the incident/event type (spill, release, etc.)
- Location of incident/event
- Type of material(s) involved in spill, release, etc.
- Quantity of material involved
- Potential of the material to move, migrate, or be transported
- Relevant time factor(s) in the risk assessment (e.g., downstream movement rate)
- Overall level of risk to water system, whether low, moderate, high, or very high
- Development of the initial risk characterization

As the flow chart indicates, several iterative cycles will occur after the initial threat assessment, including communication with local agencies and the public, further investigation of the incident, possible implementation of the water system's contingency plan, and eventual elimination of the threat and a return to normal operations. Communication activities during this period will include:

- The initial release (i.e., **A**nnouncement, **B**oil Water Advisory, **C**annot Drink, **D**o Not Use, or **E**mergency)
  - Sent to local health agencies, the public, and the news media within 30 minutes
- Notification of the local water system's source water protection and communication teams
  - If warranted by initial findings regarding the spill, release, or incident
- Notification of the WV Bureau of Public Health
  - As required
- Periodic information updates, as incident response information is received
- Updates to the applicable A-B-C-D-E advisory tier, as necessary

After the threat level is reduced and operations return to normal, the water system staff, as well as the communication and source water protection teams and their partners, will conduct a post-event review and assessment. The purpose of the review is to examine the response to the incident, relevant communication activities, and overall outcomes. Plans and procedures may be updated, altered, or adapted based on lessons learned through this process.

TIERS FLOW CHART



EMERGENCY SHORT FORMS

Emergency Communication Information

	Name	Phone Number	Email
Designated spokesperson:	John Scott Rader	304-872-5225	scott.wpsd@gmail.com
Alternate spokesperson:	Debbie Gilbert	304-872-1598	debbie.gilbert@wildernesspsd.com
Designated location to disseminate information to media:	Wilderness PSD Office		
Methods of contacting affected residents:	Wilderness PSD contacts affected residents about important information using posted notices, radio broadcasts, and television. The primary method of communication is the Nicholas County Code Red Emergency Alert system.		

	Name	Title	Phone Number	Email
Media contacts:	WSAZ	News Channel 3 NBC Affiliate- Charleston, WV	304-344-3521	news@wsaz.com
	WCHS	ABC Affiliate- Charleston, WV	304-346-5358	news@wchstv.com
	WOAY	ABC Affiliate, Oak Hill, WV	304-469-3361	news@woay.com

Emergency Services Contacts

	Name	Emergency Phone	Alternate Phone	Email
Local Police	Nicholas County Sheriff's Office	911	304-872-7880	-
Local Fire Department	Wilderness Volunteer Fire Department	911	304-872-6339	-
	Summersville Fire Department	911	304-872-1350	-

Local Ambulance Service	Jan Care of Summersville	911	304-872-5252	-
Hazardous Material Response Service	Wilderness Volunteer Fire Department	911	304-872-6339	-

Sensitive Populations

Other communities that are served by the utility:	Mount Nebo, Mount Lookout, Runa/Pool, Nallen, Keslers, Cross Lanes, Poe/Tipton, Hominy Falls/Snow Hill		
Major user/sensitive population notification:	**Name**	**Emergency Phone**	**Alternate Phone**
	Mt. Nebo Elementary	304-872-2440	-
	Mt. Lookout Elementary	304-872-2731	-
EED District Office Contact:	**Name**	**Phone**	**Email**
	John Stafford	304-256-6666	john.pb.stafford@wv.gov
	Chris Farrish	EED Central Office 304-558-2981	chris.b.farrish@wv.gov
OEHS Readiness Coordinator	Warren Von Dollen	304-356-4290 (main) 304-550-5607 (cell)	warren.r.vondollen@wv.gov

Downstream Water Contacts:	**Water System Name**	**Contact Name**	**Emergency Phone**	**Alternate Phone**
	Kanawha Falls PSD	Rick Wagner	Treatment Plant 304-779-2600	Cell 304-877-8761
	Armstrong PSD	Joe Burdett	Treatment Plant 304-442-5044	Don Navarro 304-442-5647
	WVAW-Montgomery District	Dave Peters	Treatment Plant 304-442-9728	304-340-2038
	Town of Pratt	-	304-442-8912	-
	Community of Cedar Grove	Kenneth Barton	Treatment Plant 304-595-2991	Office 304-595-1841

Are you planning on implementing the TIER system?	Yes

Key Personnel

	Name	Title	Phone	Email
Key staff responsible for coordinating emergency response procedures?	John Scott Rader	Chief Operator	304-872-5225	scott.wpsd@gmail.com
	Debbie Gilbert	Office Manager	304-872-1598	debbie.gilbert@wildernesspsd.com
Staff responsible for keeping confidential PSSC information and releasing to emergency responders:	John Scott Rader	Chief Operator	304-872-5225	scott.wpsd@gmail.com
	Debbie Gilbert	Office Manager	304-872-1598	debbie.gilbert@wildernesspsd.com

Emergency Response Information

	Name	Phone
List laboratories available to perform sample analysis in case of emergency:	Analabs- Crab Orchard, WV	1-800-880-6406, analabs@analabsinc.com
	REIC Laboratory- Beaver, WV	800-999-0105, 304-255-2500, info@reiclabs.com
	WV State Laboratory, Environmental Chemistry Section- Charleston, WV	304-965-2694
Has the utility developed a detailed Emergency Response Plan in accordance with the Public Health Security Bioterrorism Preparedness and Response Pan Act of 2002?	Yes	
When was the Emergency Response Plan developed or last updated?	2015	

EMERGENCY CONTACT INFORMATION

State Emergency Spill Notification
1-800-642-3074

Office of Emergency Services
http://www.wvdhsem.gov/
Charleston, WV- (304) 558-5380

WV Bureau for Public Health Office of Environmental Health Services (OEHS)
www.wvdhhr.org/oehs

Readiness Coordinator- Warren Von Dollen
Phone; 304-356-4290
Cell; 304-550-5607
E-mail: warren.r.vondollen@wv.gov

Environmental Engineering Division Staff
Charleston, Central Office (304) 558-2981
Beckley, District 1 (304) 256-6666
St. Albans, District 2 (304) 722-0611
Kearneysville, District 4 (304) 725-9453
Wheeling, District 5 (304) 238-1145
Fairmont, District 6 (304) 368-2530

National Response Center - Chemical, Oil, & Chemical/Biological Terrorism
1-800-424-8802

WV State Fire Marshal's Office
1-800-233-3473

West Virginia State Police
1-304-746-2100

WV Watch – Report Suspicious Activity
1-866-989-2824

DEP Distance Calculator

http://tagis.dep.wv.gov/pswicheck/

PRESS RELEASE ATTACHMENTS

TIERS Levels A, B, C, D, and E

UTILITY ISSUED NOTICE – LEVEL A

PUBLIC WATER SYSTEM ANNOUNCEMENT

A WATER SYSTEM INVESTIGATION IS UNDERWAY

On _____ at ___:____ AM/PM, the _____ Water System began investigating an incident that may affect local water quality.

The incident involves the following situation at this location:

_____

_____

_____

There are no restrictions on water use at this time. As always, if water system customers notice anything unusual about their water – such as abnormal odors, colors, sheen, etc. – they should contact the water system at _____.

At this time there is no need for concern if you have consumed or used the water.

Regular updates will be provided about this Announcement as water system staff continue their investigation. Again, there are no restrictions on water use at this time.

State Water System ID# _____ Date Distributed: _____

UTILITY ISSUED NOTICE – LEVEL B

BOIL WATER ADVISORY

A BOIL WATER ADVISORY IS IN EFFECT

On _____ at ___:____ am/pm, a water problem occurred causing contamination of your water. The areas that are affected are as follows:

□ Entire Water System or □ Other: _____

_____

CONDITIONS INDICATE THERE IS A HIGH PROBABILITY THAT YOUR WATER IS CONTAMINATED. TESTING HAS NOT OCCURRED TO CONFIRM OR DENY THE PRESENCE OF CONTAMINATION IN YOUR WATER.

What should I do?

- **DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.** Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, bathing, and food preparation **until further notice**. Boiling kills bacteria and other organisms in the water.

What happened?

- **The problem is related to** _____

What is being done?

- **The water system is taking the following action:** _____

  _____

What should a customer do if they have consumed or used the water?

- _____

We will inform you when you no longer need to boil your water. We anticipate resolving the problem within _____ hours/days. For more information, please contact _____ at _____ or _____ at _____.

General guidelines on ways to lessen the health risk are available from the EPA Safe Drinking Water Hotline at 1 (800) 426-4791.

Please share this information others who use this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice was distributed by _____

State Water System ID# _____ Date Distributed: _____

UTILITY ISSUED NOTICE – LEVEL C
"CANNOT DRINK" WATER NOTIFICATION
A LEVEL C WATER ADVISORY IS IN EFFECT

On _____ at ___:____ am/pm, a water problem occurred causing contamination of your water. The areas that are affected are as follows:

□ Entire Water System or □ Other: _____

_____

CONDITIONS INDICATE THERE IS A HIGH PROBABILITY THAT YOUR WATER IS CONTAMINATED. TESTING HAS NOT OCCURRED TO CONFIRM OR DENY THE PRESENCE OF CONTAMINATION IN YOUR WATER.

What should I do?

- **DO NOT DRINK THE WATER.** You can't drink the water, but you can use it for showering, bathing, toilet-flushing, and other non-potable purposes.
- **BOILING WILL NOT PURIFY THE WATER.** Do not drink the water, even if it is boiled. The type of contamination suspected is not removed by boiling.

What happened?

- **The problem is related to** _____

What is being done?

- **The water system is taking the following action:** _____

  _____

What should a customer do if they have consumed or used the water?

- _____

We will inform you when the water is safe to drink. We anticipate resolving the problem within _____ hours/days. For more information – or to report unusual water conditions such as abnormal odors, colors, sheen, etc. – please contact _____ at _____ or _____ at _____.

Please share this information others who use this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice was distributed by _____

State Water System ID# _____ Date Distributed: _____

UTILITY ISSUED NOTICE – LEVEL D
"DO NOT USE" WATER NOTIFICATION
A LEVEL D WATER ADVISORY IS IN EFFECT

On _____ at ___:____ am/pm, a water problem occurred causing contamination of your water. The areas that are affected are as follows:

□ Entire Water System or □ Other: _____

_____

CONDITIONS INDICATE THERE IS A HIGH PROBABILITY THAT YOUR WATER IS CONTAMINATED. TESTING HAS NOT OCCURRED TO CONFIRM OR DENY THE PRESENCE OF CONTAMINATION IN YOUR WATER.

What should I do?

- **DO NOT DRINK THE WATER.** The water is contaminated.
- **DO NOT SHOWER OR BATHE IN THE WATER.** You can't use the water for drinking, showering, or bathing. It can be used for toilet flushing and firefighting.
- **BOILING WILL NOT PURIFY THE WATER.** Do not use the water, even if it is boiled. The type of contamination suspected is not removed by boiling.

What happened?

- **The problem is related to** _____

What is being done?

- **The water system is taking the following action:** _____

What should a customer do if they have consumed or used the water?

- _____

We will inform you when the water is safe to drink. We anticipate resolving the problem within _____ hours/days. For more information – or to report unusual water conditions such as abnormal odors, colors, sheen, etc. – please contact _____ at _____ or _____ at _____.

Please share this information others who use this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice was distributed by _____

State Water System ID# _____ Date Distributed: _____

UTILITY ISSUED NOTICE – LEVEL E
EMERGENCY WATER NOTIFICATION
A LEVEL E WATER ADVISORY IS IN EFFECT

On _____ at ___:____ am/pm, a water problem occurred causing contamination of your water. The areas that are affected are as follows:

□ Entire Water System or □ Other: _____

_____

CONDITIONS INDICATE THERE IS A HIGH PROBABILITY THAT YOUR WATER IS CONTAMINATED. TESTING HAS NOT OCCURRED TO CONFIRM OR DENY THE PRESENCE OF CONTAMINATION IN YOUR WATER.

What should I do?

- **DO NOT DRINK THE WATER.** The water is contaminated.
- **DO NOT USE THE WATER FOR ANY PURPOSE!** You can't use the water for drinking, showering, or bathing, or any other use – not even for toilet flushing.
- **BOILING WILL NOT PURIFY THE WATER.** Do not use the water, even if it is boiled. The type of contamination suspected is not removed by boiling.

What happened?

- **The problem is related to** _____

What is being done?

- **The water system is taking the following action:** _____

What should a customer do if they have consumed or used the water?

- _____

We will inform you when the water is safe to drink. We anticipate resolving the problem within _____ hours/days. For more information – or to report unusual water conditions such as abnormal odors, colors, sheen, etc. – please contact _____ at _____ or _____ at _____.

Please share this information others who use this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

This notice was distributed by _____

State Water System ID# _____ Date Distributed: _____

APPENDIX D. SINGLE SOURCE FEASIBILITY STUDY

Source Water Protection Plan

Contingency Plan and Feasibility Study

WILDERNESS PSD

PWSID WV3303405
NICHOLAS COUNTY

SEPTEMBER 2015

Prepared by:

Tetra Tech, Inc.
803 Quarrier Street, Suite 400
Charleston, WV 25314

In cooperation with Wilderness PSD

TETRA TECH

Victor A D'Amato
Victor D'Amato, PE

9-14-15
Date

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Tables

Appendices

Background

To fulfill the requirements of Senate Bill 373 and Legislative Rule 64 CSR 3, Wilderness PSD has participated in a study to evaluate its existing contingency planning and feasibility of source water alternatives. This Contingency Planning and Feasibility Study report documents the results of the study and provides information about the utility's ability to prevent contaminants from entering the water system if possible, and sufficiently respond to an emergency if necessary. This report represents only a portion of the required elements of the Source Water Protection Plan (SWPP) for Wilderness PSD. The information presented in this report will be included in the final Source Water Protection Plan.

Contingency Plan

The goal of contingency planning is to identify and document how the utility will prepare for and respond to any drinking water shortages or emergencies that may occur due to short and long term water interruption, or incidents of spill or contamination. Utilities should examine their capacity to protect their intake, treatment facility, and distribution system from contamination. They should also review their ability to use alternative sources, minimize water loss, meet future water demands, and operate during power outages. In addition, utilities should report the feasibility of establishing an early warning monitoring system. The following sections address these considerations and present information required for the source water protection plan.

Responding to Water Shortage or Contamination Event

Isolating or diverting any possible contaminant from the intake for a public water system is an important strategy in the event of an emergency. One commonly used method of diverting contaminants from an intake is establishing booms around the intake. This can be effective, but only for contaminants that float on the surface of the water. Alternatively, utilities can choose to pump floating contaminants from the water or chemically neutralize the contaminant before it enters the treatment facility.

Public utilities using surface sources should be able to close the intake by one means or another. However, depending upon the system, methods for doing so could vary greatly from closing valves, lowering hatches or gates, raising the intake piping out of the water, or shutting down pumps. Systems should have plans in place in advance as to the best method to protect the intake and treatment facility. Utilities may benefit from turning off pumps and, if possible, closing the intake opening to prevent contaminants from entering the piping leading to the pumps. Utilities should also have a plan in place to sample raw water to identify the movement of a contaminant plume and allow for maximum pumping time before shutting down an intake (see Early Warning Monitoring System section). The amount of time that an intake can remain closed depends on the water infrastructure and should be determined by the utility before an emergency occurs. The longer an intake can remain closed in such a case, the better.

Raw and treated water storage capacity in the event of such an emergency also becomes extremely important. Storage capacity can directly determine how effectively a water system can respond to a contamination event and how long an intake can remain closed. Information regarding the water shortage response capability of Wilderness PSD is provided in **Table 1**.

Statewide initiatives for emergency response, including source water related incidents, are being developed. These include the West Virginia Water/Wastewater Agency Response Network (WV WARN, see http://www.wvwarn.org/) and the Rural Water Association Emergency Response Team (see

http://www.wvrwa.org/). Wilderness PSD has analyzed its ability to effectively respond to emergencies and this information is also provided in **Table 1**.

Table 1. Wilderness PSD Water Shortage Response Capability

Can the utility isolate or divert contamination from the intake or groundwater supply?	Yes
Describe the utility's capability to isolate or divert potential contaminants:	The utility has booms they can deploy to protect the intake from surface contaminants.
Can the utility switch to an alternative water source or intake that can supply full capacity at any time?	Yes
Describe in detail the utility's capability to switch to an alternative source:	Wilderness has two separate intakes on two different water sources. The primary intake is in the Meadow River and the secondary intake is in Anglins Creek near the mouth. While the Anglins Creek intake is considered a separate source, backwaters from the Meadow River likely influence the intake. Thus, any contamination event on the Meadow River may also compromise the Anglins Creek intake. If Meadow River is impacted by a contamination event, the utility has considered running a temporary line upstream of the point of contamination or upstream of the backwaters of Meadow River on Anglins Creek. Wilderness has also considered relocating the permanent intake on Anglins Creek above the backwaters.
Can the utility close the water intake to prevent contamination from entering the water supply?	Yes
How long can the intake stay closed?	If the utility was able to use the Anglins Creek intake (assuming it is not influenced by backwaters), they could leave the Meadow River intake closed indefinitely depending on seasonal water levels in Anglins Creek. If they had to close both intakes, their treated water storage would last more than 2 days.
Describe the process to close the intake:	The utility can manually close valves to shut the intake off from the treatment plant.
Describe the raw and treated water storage capacity of the water system:	The utility has 6 treated storage water tanks and 3 booster pump stations (BPS) Zoar Tank-150,000 gal.

	Mt. Lookout Tank-100,000 gal. Mt. Nebo Tank 1-200,000 gal. Mt. Nebo Tank 2-200,000 gal. Old Nicholas Tank- 32,000 gal. Snow Hill Tank- 125,000 gal. **Total- 807,000 gallons treated water storage** The utility does not have raw water storage.
Is the utility a member of WVRWA Emergency Response Team?	The utility is a member of WV Rural Water but not the Emergency Response Team
Is the utility a member of WV-WARN?	Yes
List any other mutual aid agreements to provide or receive assistance in the event of an emergency:	The utility has informal mutual aid agreements with other nearby water utilities such as Summersville Municipal Water. Wilderness PSD has hauled water from Summersville in water tankers during past emergencies.

Operation During Loss of Power

Wilderness PSD analyzed and examined its ability to operate effectively during a loss of power. This involved ensuring a means to supply water through treatment, storage, and distribution without creating a public health emergency. Information regarding the utility's capacity for operation during power outages is summarized in **Table 2**.

Table 2. Wilderness PSD Generator Capacity

What is the type and capacity of the generator needed to operate during a loss of power?	The water system requires 5 generators to operate at full capacity during a power outage. The utility has stationary generators at the treatment plant, water utility office, and all three of the booster pump stations. The utility has plans to purchase a portable generator as a backup in case one of the others are out of service.
Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.	No. The intake pumps are powered by the treatment plant so they do not require a generator of their own.
Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.	Yes. The treatment plant is equipped with a 150 kW diesel generator that is hardwired to a transfer switch that must be manually switched over.

Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.	Yes. All three booster pump stations in the distribution system are hardwired to generators, some of which are manually operated and some which engage automatically. The following generators are located throughout the distribution system: Runa BPS- 20kW propane Old Nicholas Rd. BPS- 65 kW propane Snow Hill BPS-41 kW diesel Water Utility Office- 20kW propane
Does the utility have adequate fuel on hand for the generator?	Yes

	Gallons	**Hours**
What is your on-hand fuel storage and how long will it last operating at full capacity?	Water treatment plant-300 gal. diesel storage tank	36 hours
	Runa BPS-120 gal. propane storage	100+ hours
	Old Nicholas Rd. BPS- 120 gal. propane storage	40 hours
	Snow Hill BPS- 200 gal. diesel storage	36 hours
	Utility Office- 120 gal. propane storage	100+ hours

		Supplier	**Contact Information**
Provide a list of suppliers that could provide generators and fuel in the event of an emergency:	**Generator**	Cummins Crosspoint- Cross Lanes, WV	(304) 769-1012
	Generator	Sunbelt Rentals- Charleston, WV	(304) 342-5000
	Fuel	Wilderness PSD-Portable Diesel Fuel Tank	N/A
	Fuel	U-Save Propane	(304) 872-9334

Does the utility test the generator(s) periodically?	Yes- The utility runs a monthly test on their generators.

Does the utility routinely maintain the generator?	The utility currently performs maintenance on their generators on a yearly basis, but they are considering hiring Cummins to maintain them in the future.
If no scenario describing the ability to connect to generator matches the utility's system or if utility does not have ability to connect to a generator, describe plans to respond to power outages:	N/A

Future Water Supply Needs

When planning for potential emergencies and developing contingency plans, a utility needs not only to consider their current demands for treated water but also account for likely future needs. This could mean expanding current intake sources or developing new ones in the near future. This can be an expensive and time consuming process, and any water utility should take this into account when determining emergency preparedness. Wilderness PSD has analyzed its ability to meet future water demands at current capacity, and this information is included in **Table 3**.

Table 3. Future Water Supply Needs for Wilderness PSD

Is the utility able to meet water demands with the current production capacity over the next 5 years? If so, explain how you plan to do so.	Yes. The treatment plant currently has excess capacity and they do not expect any significant changes in population in the service area in the next 5 years. The water system's opinions concerning the demand for the next five years are generally supported by population trends projected based on US Census Bureau 2000 and 2010 data. According to the 2005 Interim State Population Projections [(1)], WV as a whole will see a population decline between 2010 and 2030. In addition, researchers at the WVU College of Business and Economics specifically project that populations within Nicholas County will decrease from actual population of 26,233 in 2010 to a projected population of 25,878 in 2020 [(2)]. Census data and projections cannot account for increases in daily demand due to water line extensions. If in the future water line extension projects are proposed the daily demands will be reassessed to determine if the source and treatment facilities can support increased demand.
If not, describe the circumstances and plans to increase production capacity:	N/A

(1)US Department of Commerce, United State Census Bureau. 2005 Interim State Population Projections. Table 1. http://www.census.gov/population/projections/data/state/projectionsagesex.html. Accessed June 10, 2015.

(2) Christiadi, Ph.D., Deskins, John, Ph.D., Lego, Brian. WVU College of Business and Economics, Bureau of Business and Economic Research. March 2014. WVU Research Corporation. http://be.wvu.edu/bber/pdfs/BBER-2014-04.pdf Accessed June 10, 2015.

Water Loss

In any public water system there is a certain percentage of the total treated water that does not reach the customer. Some of this water is used in treatment plant processes such as back washing filters or flushing piping, but there is usually at least a small percentage that goes unaccounted for. This can include unmetered uses, leaks, and other losses. To measure and report on this unaccounted for water, a public utility must use the same method used in the Public Service Commission's rule, *Rules for the Government of Water Utilities*, 150CSR7, section 5.6. The rule defines unaccounted for water as the volume of water introduced into the distribution system less all metered usage and all known non-metered usage which can be estimated with reasonable accuracy.

Metered usages are most often those that are distributed to customers. Non-metered usages that are being estimated include uses such as by the fire departments for fires or training, un-metered bulk sells, flushing to maintain the distribution system, and water used for backwashing filters and cleaning settling basins. By totaling the metered and non-metered uses, the utility can calculate unaccounted for water. Note: To complete annual reports submitted to the PSC, utilities typically account for known water main breaks by estimating the amount of water lost. However, for the purposes of the source water protection plan, any water lost due to leaks, even if the system is aware of how much water is lost at a main break, is not considered a use. Water lost through leaks and main breaks cannot be controlled during a water shortage or other emergency and should be included in the calculation of percentage of water loss for purposes of the source water protection plan. The data in **Table 4** is taken from the most recently submitted Wilderness PSD PSC Annual Report.

Table 4. Water Loss Information*

Total Water Pumped (gal)		110,163,000
Total Water Purchased (gal)		0
Total Water Pumped and Purchased (gal)		110,163,000
Water Loss Accounted for Except Main Leaks (gal)	**Mains, Plants, Filters, Flushing, etc.**	0
	Fire Department	4,410,000
	Back Washing	0
	Blowing Settling Basins	4,607,000
Total Water Loss Accounted For Except Main Leaks		9,017,000
Water Sold- Total Gallons (gal)		80,789,000
Unaccounted For Lost Water (gal)		20,357,000

Water lost from main leaks (gal)	0
Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)	20,357,000
Total Percent Unaccounted For Water and Water Lost from Main Leaks (gal)	18.48%
If total percentage of Unaccounted for Water is greater than 15%, please describe any measures that could be taken to correct this problem:	The utility has an ongoing leak detection program and actively manages pressure within the system to minimize water loss.

*This information was taken from the 2014 Public Service Commission Annual Report for Wilderness PSD

Early Warning Monitoring System

Public water utilities are required to provide an examination of the technical and economic feasibility of implementing an early warning monitoring system. Implementing an early warning monitoring system may be approached in different ways depending upon the water utility's resources and threats to the source water. A utility may install a continuous monitoring system that will provide real time information regarding water quality conditions. This would require utilities to analyze the data in order to establish what condition is indicative of a contamination event. Continuous monitoring will provide results for a predetermined set of parameters. The more parameters being monitored, the more sophisticated the monitoring equipment will be. When establishing a continuous monitoring system, the utility should consider the logistics of placing and maintaining the equipment, and receiving output data from the equipment.

Alternately, or in addition, a utility may pull periodic grab samples on a regular basis, or in case of a reported incident. The grab samples may be analyzed for specific contaminants. A utility should examine their Potential Sources of Significant Contamination (PSSCs) to determine what chemical contaminants could pose a threat to the water source. If possible, the utility should plan in advance how those contaminants will be detected. Consideration should be given to where samples will be collected, the preservation and hold times for samples, available laboratories to analyze samples, and costs associated with the sampling event. Regardless of the type of monitoring (continuous or grab), utilities should collect samples for their source throughout the year to better understand the baseline water quality conditions and natural seasonal fluctuations. Establishing a baseline will help determine if changes in the water quality are indicative of a contamination event and inform the needed response.

Every utility should establish a system or process for receiving or detecting chemical threats with sufficient time to respond to protect the treatment facility and public health. All approaches to receiving and responding to an early warning should incorporate communication with facility owners and operators, with state and local emergency response agencies, with surrounding water utilities, and with the public. Communication plays an important role in knowing how to interpret data and how to respond.

Wilderness PSD has analyzed its ability to monitor for and detect potential contaminants that could impact its source water. Information regarding this utility's early warning monitoring system capabilities can be found in **Table 5** and in **Appendix A.**

Table 5. Early Warning Monitoring System Capabilities

<table>
<tr><td colspan="2">Does your system currently receive spill notifications from a state agency, neighboring water system, local emergency responders, or other facilities? If yes, from whom do you receive notices?</td><td colspan="2">Yes. Wilderness PSD regularly receives notifications from the WV Department of Environmental Protection and WV Bureau for Public Health.</td></tr>
<tr><td colspan="2">Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?</td><td colspan="2">The 2011 Source Water Protection Plan identified potential contaminant sources and critical areas from which a spill could be expected, including highways, log landing sites, and mine sites.</td></tr>
<tr><td colspan="2">Are you prepared to detect potential contaminants if notified of a spill?</td><td colspan="2">Yes</td></tr>
<tr><td rowspan="4">List laboratories (and contact information) on whom you would rely to analyze water samples in case of a reported spill.</td><td colspan="3">Laboratories</td></tr>
<tr><td>Name</td><td colspan="2">Contact</td></tr>
<tr><td>Analabs- Crab Orchard, WV</td><td colspan="2">1-800-880-6406, analabs@analabsinc.com</td></tr>
<tr><td>REIC Laboratory- Beaver, WV</td><td colspan="2">800-999-0105, 304-255-2500, info@reiclabs.com</td></tr>
<tr><td colspan="2">Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?</td><td colspan="2">WV State Laboratory, Environmental Chemistry Section- Charleston, WV</td><td>(304) 965-2694</td></tr>
<tr><td colspan="2">Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?</td><td colspan="3">Yes. The utility tests the incoming raw water every two hours while they are in operation and sometimes more often depending on turbidity, pre-sedimentation effluent, and pre-chlorine levels. They have established baseline water quality conditions for their primary water sources.</td></tr>
<tr><td colspan="2">Does your utility currently monitor raw water (through continuous monitoring or periodic grab samples) at the surface water intake or from a groundwater source on a regular basis?</td><td colspan="3">No. See attached Form B in Appendix A.</td></tr>
</table>

Provide or estimate the capital and O&M costs for your proposed early warning monitoring system or upgraded system.	**Monitoring System**	**YSI EXO 2 (Table B-1)**	**Hach sc1000 (Table B-2)**	**Real Tech Full Scanning Monitoring System (Table B-3)**
	Capital	Approximate Capital Cost- $19,000	Approximate Capital Cost- $18,907	Approximate Capital Cost- $24,155
	Yearly O & M	Parts and calibration- Approximately $1000 Data management and telemetry- $1000	Full service contract with Hach Technician- $2,258 Online Viewer-$600	Replacement Lamps- $1,480 Smart-Sense Monitoring Service- $499
Do you serve more than 100,000 customers? If so, please describe the methods you use to monitor at the same technical levels utilized by ORSANCO.		No		

Single Source Feasibility Study

If a public water utility's water supply plant is served by a single–source intake in a surface water source of supply or a surface water influenced source of supply, the submitted source water protection plan must also include an examination and analysis of the technical and economic feasibility of developing alternative sources of water to provide continued safe and reliable public water service in the event its primary source of supply is detrimentally affected by contamination, release, spill event or other reason. These alternatives may include a secondary intake, two days of raw or treated water storage in addition to what is currently stored to meet water system design standards, interconnection with neighboring systems, or other options identified on a local level. Note that a secondary intake must draw water supplies from a substantially different location on the existing water source, or from an entirely different water source.

To accomplish this requirement, the utility has examined existing and possible alternatives and ranked them by their technical, economic, and environmental feasibility according to the WV Department of Health and Human Resources Bureau for Public Health (WVBPH) feasibility study guide. This guide provides several criteria to consider for each category, organized in a Feasibility Study Matrix. By completing the Feasibility Study Matrix, the utility has documented the process used to examine the feasibility of each alternative, and has generated scores that compare the alternatives. The Feasibility Study Matrix is attached as **Appendix B**.

In addition to the Feasibility Study Matrix spreadsheet, a brief narrative is also included in **Appendix B** that identifies one or more feasible alternative, provides a summary of data used to make this determination, and briefly summarizes the results of the matrix.

Appendix A. Early Warning Monitoring System

Form B-Proposed Early Warning Monitoring Systems- Surface Water Source

Wilderness PSD

Primary Surface Water Source: Meadow River

There are many possible solutions for designing and installing an early warning monitoring system. Over time, this technology changes and improves and it is difficult to determine the type of equipment that will be useful and effective in the long term. This plan is a proposed system that would work for Wilderness PSD using current technology and the current plant and intake configuration.

Wilderness PSD regularly accesses two different raw water sources: Anglins Creek and the Meadow River. These proposed plans focus on the Meadow River, which the operator has identified as their primary source. The water treatment plant is located very close to the intake pipe, so two of these proposals suggest that the monitoring equipment be located in the treatment plant itself.

Table B-1. YSI EXO 2 Monitoring System Proposal
Describe the type of early warning detection equipment that could be installed, including the design.
This plan uses the YSI EXO 2 Multiport Sonde, which can accommodate 6 different sensors and has an automatic wiper mechanism to remove biofouling from the sensor tips, which reduces maintenance time. The sonde is built to be resilient and low maintenance, and is capable of providing online water quality monitoring that can be transmitted real time to a designated PC or website that can be accessed by any designated user. The sonde can hold up to 6 sensors, but this plan recommends 4 of the more basic sensors that would be sufficient to detect any sudden shifts in water quality in the Meadow River. These sensors would include: conductivity/temperature, optical dissolved oxygen, pH, and fluorescent dissolved organic matter (fDOM). The fDOM sensor could potentially detect petroleum products in the water but is not entirely reliable for this purpose. At this time, YSI does not make a sensor for petroleum products for the EXO 2 but likely will in the future, at which time it is recommended that the utility purchase it. Other sensors could be purchased in the future as well if deemed necessary by the utility.
Where would the equipment be located?
The sonde would be attached to the intake pipe itself, which extends into the Meadow River. This would provide a stable foundation for the equipment and also ensure that the device is able to sample the water

that is actually entering the actual intake pipe and not missing potential contaminants because it is located on the wrong side of the stream or too far from the intake. The suggested method of mounting the sonde involves drilling holes in a PVC pipe, capping the end, inserting the sonde and attaching to the intake pipe structure using brackets or chains. This will protect the sensor from debris and hide it from view somewhat.

The sonde would be hardwired to the YSI Storm 3 data analysis/telemetry system. Since the Wilderness PSD water treatment plant is so close to the intake, the Storm 3 could likely be located in the plant itself. If this was not possible and it needed to be located on the bank closer to the intake, the unit is contained in a waterproof case and comes with a solar photovoltaic panel capable of powering both the data analysis unit and the sonde, so long as the sonde is hardwired to the Storm 3. The device can be battery powered as well if this is not an option.

What would the maintenance plan for the monitoring equipment entail?

The maintenance plan for the system would involve replacing the dissolved oxygen sensor cap, replacing the pH electrode cap, and purchasing pH, turbidity, and conductivity calibration solution on a yearly basis. The sonde itself is designed to last from 5-10 years and should be inspected and calibrated once a month.

In addition, there is a recurring yearly fee associated with the real-time data/telemetry package for managing the website and data analysis.

Describe the proposed sampling plan at the monitoring site.

The sonde can be programmed to take regular measurements at any intervals defined by the operator or user. These measurements can also be taken in bursts, averaged over a period of time, or modified automatically as water quality levels change. Data is stored in the Storm 3 and transmitted to the plant computer as it is recorded. This information can be transmitted wirelessly via a cellular modem. The cellular transmitter is powerful enough to work even in areas with poor cell reception.

Describe the proposed procedures for data management and analysis.

The Storm 3 package includes data management software that can generate data reports and presentations and allow the user to modify and adjust sampling schedules remotely from the plant.

The sonde can be programmed to alert the user when any of the water quality parameters exceeds a user-defined level. This will allow the operator to program the system to notify them when their previously observed baseline conditions are exceeded in time for them to shut down the pumps and close off the intake. The operator can receive alerts via text message and email at the treatment plant computer or any designated cell phone.

Table B-2. Hach sc1000 Monitoring System Proposal
Describe the type of early warning detection equipment that could be installed, including the design.
The Hach sc1000 online monitoring system includes a controller, back panel, display module, and trough. Raw water is pumped into the trough from the source where it can be sampled in real time. The probe module can accommodate up to 6 sensors, which means it can monitor up to 6 parameters at once. This plan suggests the following sensors: conductivity, pH, turbidity, and dissolved oxygen. Hach can also supply a sensor to detect oil in water, which would cost an additional $18,414.00 and would possibly be a good investment for any water system if sufficient funds were available. This sensor is not included in the quoted capital cost. There are several other probes for other parameters that are available from Hach, and these could be purchased as deemed necessary by the utility.
Where would the equipment be located?
The sc1000 Controller, back panel, and trough would be located in the Wilderness treatment plant itself. A small diameter line would run out from the plant the length of the intake pipe to pull raw water back to the controller where it would flow into the trough for sampling. The closer this sampling line can be to the actual intake, the more accurately it will reflect the raw water that is actually entering the plant. This option would require the utility to purchase a line or hose long enough to reach the intake pipe and a small pump. The line and pump could be fairly low- tech and inexpensive, as the sc1000 only requires a minimum of 900 mL/min. of flow. The controller will be equipped with the MODBUS advanced communications/networking unit, which can transmit readings in real time directly to the SCADA system in the treatment plant to alert the operators in any change in baseline water quality. The sc1000 can either be hardwired to the computer at the treatment plant or it can use a cellular modem to transmit the data if there is sufficient cellular signal. Since the system would be located in the plant in this case, this would not be necessary.
What would the maintenance plan for the monitoring equipment entail?
The maintenance plan for the system would entail a yearly maintenance contract with the manufacturer. A Hach Service Representative would regularly service the monitoring equipment. This service would take care of all parts, labor, and preventative maintenance and would include 2-3 scheduled maintenance visits per year.
Describe the proposed sampling plan at the monitoring site.
The sc1000 monitors the quality of water flowing through the trough in real time, and can transmit this data to the plant computer as it is collected. The actual timing of the sampling plan could be determined by the utility.

Describe the proposed procedures for data management and analysis.
It is recommended that the utility purchase the Hach Universal Data Gateway software, which would help to process and analyze the incoming information into easily interpreted reports. The price of this software is included in the rough capital cost.

Table B-3. Real Tech Full Scanning UV-VIS Monitoring System
Describe the type of early warning detection equipment that could be installed, including the design.
This plan utilizes the Real Tech Full Scanning UV-VIS monitoring system, which provides full ultraviolet/visible scanning for specific parameters and event detection. The included PC Controller is pre-loaded with the software needed to store and process this information to establish a "normal" or "baseline" set of conditions for the raw water source. In addition to the UV-VIS sensors, the system can accommodate up to 8 additional sensors that are available from a third party and priced separately. This plan includes pricing and details for a system equipped to measure conductivity, pH, temperature, and dissolved oxygen. Other additional sensors could be purchased and added if deemed necessary by the utility.
Where would the equipment be located?
In the case of Wilderness PSD, the UV-VIS Full Monitoring System could be located in the water treatment plant since it is so close to the raw water intake. A small-diameter line or hose would run from the treatment plant to the intake pipe to pull raw water back to the controller where it would flow into the unit for sampling. The closer the end of the sampling line can be to the actual intake, the more accurately it will reflect the raw water that is actually entering the plant. This option would require the utility to purchase enough line to reach the intake as well as a small pump. The sampling line and pump could be fairly small and inexpensive, as the system only requires a minimum of 300-800 mL/min. of flow. The system also includes the Real Pump Clean System, which provides flow and automatic chemical cleaning of the sensors and reduces maintenance time. This system would require a reliable electrical source, but the intakes are located adjacent to the treatment plant at Wilderness so electrical supply is not an issue.
What would the maintenance plan for the monitoring equipment entail?
The maintenance plan for the system would require about 2 hrs/month for scheduled maintenance tasks. It is also recommended that a monthly laboratory reference sample is taken to effectively calibrate the sensors.

The Smart-Sense Web Monitoring Service package costs an additional $499/yr., but provides additional support and remote accessibility by Real Tech, and it is recommended. The Deuterium and Tungsten lamps would also need to be replaced every six months at a cost of $740.
Describe the proposed sampling plan at the monitoring site.
The Full Scanning UV-VIS system continuously monitors raw water as it is pumped to through the unit, and is capable of establishing baseline conditions that account for seasonal variability, which can help to reduce false alarms.
Describe the proposed procedures for data management and analysis.
The Real Tech monitoring system is capable of communicating with the treatment plant computer via Modbus, Ethernet, USB, or cell modem. It can be integrated with the treatment plant's SCADA system to provide real-time information about conditions at the intake and provides full remote monitoring. It is also recommended that the utility take advantage of the Smart-Sense Web Monitoring service offered by Real-Tech to analyze and interpret data taken by the monitoring system. This consultation service requires an additional service fee, which is included in this quote.

Single Source Alternatives Feasibility Study

WILDERNESS PSD

PWSID: WV3303405

PURPOSE

This Source Water Alternatives Feasibility Study (the Study) is prepared in accordance with legislative rule 64CSR3. The rule provides for numerous source water protection planning activities. As part of these activities, if a secondary source of water supply is not available, public water systems (PWSs) are required to prepare a study to determine the technical and economic feasibility of the following options to provide continued water service in the event the source water becomes contaminated. The options include:

- Constructing or establishing a secondary or backup intake which would draw water supplies from a substantially different location or water source;
- Constructing additional raw water storage capacity and/or treated water storage capacity to provide at least two days of system storage based on the plant's maximum level of production experience in the last year;
- Creating or constructing an operation interconnection(s) between PWS with other PWS plants or another PWS to allow the utility to receive its water from a different source of supply;
- Any other alternative which is available to the PWS to secure safe and reliable alternative water supply.

If one or more of the above options is determined to be feasible, the PWS is required to provide additional detail on the costs, risks and benefits of implementing each feasible alternative.

This Study utilizes the matrix provided by the West Virginia Department of health and Human Resources, Bureau for Public Health to determine the feasibility of the alternatives for the Wilderness Public Services District (PSD). The matrix provides a systematic method of evaluating alternatives using numerous factors and a system to rank the economic, technical and environmental feasibility of each alternative.

SYSTEM DESCRIPTION

The Wilderness PSD PWS provides water service to approximately 4,800 people. Located in Nicholas County, the PWS has intakes on the Meadow River and Anglins Creek for its raw water supply. The Meadow River intake is the primary source of supply but it is generally used in conjunction with Anglins Creek. **Figure 1** presents the location of the PWS. The current permitted capacity of the WTP is 0.504 MGD. The WTP uses coagulation, flocculation, sedimentation, filtration, disinfection and fluoridation to treat the water to potable standards. **Table 1** below provides a summary of the capacity and recent average day and maximum day demands for the Wilderness system.

Table 1. Wilderness PSD PWS Capacity and Demands

Parameter	Value
2014 Average Day Demand (ADD) (MGD)	0.299
2014 Maximum Day Demand (MDD) (MGD)	0.461
WTP Capacity (MGD)	0.504
WTP Utilization at Maximum Day Demand	91.5%
MDD to ADD Ratio [(1)]	1.54

(1) Ratio Calculated using Maximum Daily Demand (MDD)/Average Daily Demand (ADD)

Storage in the Wilderness system is provided by elevated and standpipe style storage tanks throughout the distribution system. **Table 2** provides a summary of the tanks.

Table 2. City of Wilderness Storage

Name	Type	Volume (gallons)
Zoar	Elevated	150,000
Mount Lookout 1	Standpipe	100,000
Mount Lookout 2	Standpipe	100,000
Mount Nebo 1	Standpipe	200,000
Mount Nebo 2	Standpipe	200,000
Old Nicholas	Standpipe	32,000
Snow Hill	Elevated	125,000
Total		807,000
2014 ADD (MGD)		0.299
Days Storage		2.70 days

On a system-wide basis Wilderness exceeds the 2 days at average day demand storage requirement, although it is unknown if the system has difficulties in achieving a 20% volume turnover without discharging from the system. The most recent sanitary survey does indicate that the PWS has issues with increasing non-revenue water, although it is unknown if this could be due to meeting turnover requirements.

The Mount Nebo tanks are the main storage for the system and supply the other tanks that are located towards the edges of the system. The Mount Lookout area has historically been the most sensitive for maintaining storage volume but the recently constructed second tank is expected to help alleviate the issue.

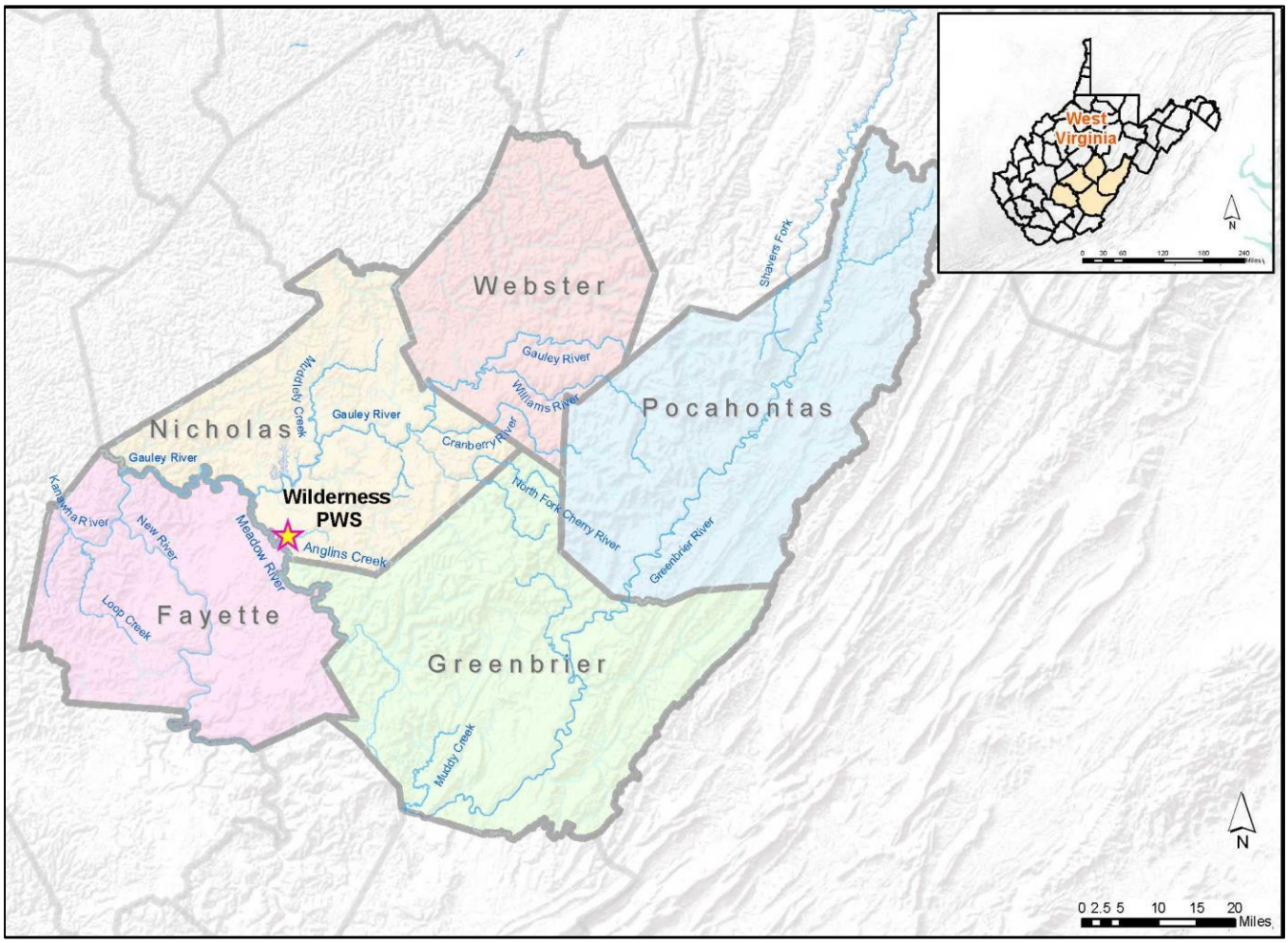

Figure 1. Wilderness PSD Location Map

The alternatives are evaluated based on their ability to match the capacity of the Wilderness WTP. This will provide a common level of service among all alternatives. **Table 3** below provides the basis for sizing each alternative.

Table 3. Alternatives – Sizing Basis

Alternative	Backup Intake	Raw Storage	Treated Storage	Interconnect
Basis	Max day	2 days of max day demand	2 days of max day demand	Average day
Value	0.504 MGD	1.07 MG	1.07 MG	0.327 MGD

(1) Calculated using the MDD to ADD Ratio

Cost estimates were developed based on a conceptual analysis of each alternative. All costs were reviewed for accuracy and compared with actual costs of similar projects and RSMeans CostWorks 2014. The estimates

include materials, installation and contractor's overhead and profit. The estimates are also based on the following assumptions and considerations:

- Piping is priced as mechanical joint ductile iron unless noted otherwise, and includes provisions for road crossings, aerial crossings and site restoration.
- Raw water and treated water storage tanks are priced as steel ground tanks with site work and installation included.
- Pumps are sized and priced based on conceptual level estimates of the required pumping conditions (flow and total dynamic head).
- Precast concrete vaults and metal pump enclosures are sized to house the estimated number of pumps required along with HVAC, electrical, and controls equipment.
- Electrical and controls costs are estimated at 10% of the overall facility costs including pumps.
- Site work is estimated as a lump sum cost based on the approximate size of the disturbed area and other factors that affect level of effort (e.g., whether or not the site is within the 100-yr floodplain).
- Estimates include a 15% engineering allowance and a 30% contingency.
- For purposes of this comparative analysis, costs for land acquisition were estimated at an average $70,000 per acre. This value was used consistently for each alternative and was selected as an average cost to account for unknown site specific variables (e.g. land and structure values, potential remediation costs, acquisition services, etc.).

All capital costs are annualized over a twenty year period using a 2.5% interest rate and 0.50% closing costs.

O&M cost estimates are developed based on the specific operational requirements for each alternative and include labor and materials. Estimates of power consumption of pumps are based on pump size, number of pumps, and estimated hours of operation. O&M tank estimates assume the exterior and interior are repainted every ten years and the raw water tanks are cleaned annually and treated water tanks cleaned every 5 years.

Backup Intake

The WTP currently has a backup intake at the mouth of Anglins Creek where it discharges to the Meadow River. Due to an eddy effect in the area, the intake cannot be considered isolated from the Meadow River. An alternate intake further up Anglins Creek is proposed to avoid the influence of the Meadow River. There is no available flow data on Anglins Creek but PSD staff have stated from experience that the Creek should be able to meet the demands of the system most of the year. The proposed intake would be located about 650 feet upstream of the existing intake.

Raw Water Storage

The raw water storage alternative includes installing a 1.2 MG (1.0 MG usable volume) steel ground storage tank on purchased land adjacent to the WTP site. The tank would require increasing the size of the pumps at the intake structure to fill the tank and installing an additional set of pumps to transfer raw water from the tank to the WTP. This option includes by-pass piping to allow for the tank to be taken off-line for periodic cleaning.

Treated Water Storage

Like the raw water storage alternative, the tankage would be located on land adjacent to the WTP and have a similar size and configuration without requiring modifications to the intake pumps. Providing treated water

storage over and above the required two days ADD (which the system already exceeds) presents some operational challenges for the PWS in meeting the 20% daily turnover requirement. With full tanks, the PWS may be faced with having to flush water during periods of low demand to meet the turnover requirement, increasing the already high non-revenue for water for the system.

Interconnection

Wilderness has plans to interconnect with Gauley River PSD for 100 gpm of flow to supply the Zoar pressure zone. In the past, Wilderness had plans to connect to the Summersville PWS through Nettie PSD, however, Nettie has not pursued its end of the interconnection. A direct route to Summersville would require 95,000 feet of 6-inch pipe, associated valves and a pump station to transfer the water to the Wilderness service area.

The New Haven PSD is also within the range to interconnect with Wilderness, however, it is unknown if the PWS has sufficient capacity.

FEASIBILITY DETERMINATION

The attached matrix and sub-schedules (**Tables 4, 5, 6, and 7**) present the feasibility rankings of the alternatives. All four options are presented as viable alternatives. An interconnection with Summersville is the lowest ranked alternative primarily due to the cost of extending a pipeline.

Treated water storage is a possible alternative but given that there is currently over two days of storage in the system, adding additional volume would create potential operational issues associated with having to maintain a 20% turnover in volume (needed to avoid water quality concerns such as disinfection byproducts or low chlorine residual) and increasing nonrevenue water.

Raw water storage is identified as a feasible alternative with high scores for all three ranking criteria.

A backup intake on Anglins Creek is the most feasible alternative with a low cost and minimal impact on the system's current operation, but implementation is contingent upon the creek having sufficient capacity. For this alternative, a gravity supply line to the existing wet well could possibly be utilized to reduce costs. However, there may be additional regulatory hurdles associated with using the existing wet well due to potential contamination from the original source. For the purposed of this analysis, a pump station and pressurized supply line were used as a conservative approach.

Table 4. Feasibility Matrix

Water Management Strategy Description	Economic Criteria					Technical Criteria							Environmental Criteria						Final Score	Capital Cost	Comments
	45%					45%							10%						100%		
	Operation and Maintenance Costs	Capital Costs	**Total**	**Total %**	**Weighted Total**	Permitting	Flexibility	Resilience	Institutional Requirements	**Total**	**Total %**	**Weighted Total**	Environmental Impacts	Aesthetic Impacts	Stakeholder Issues	**Total**	**Total %**	**Weighted Total**			
Backup Intake	3.0	3.0	**6.0**	**100.0%**	**45.0%**	2.0	3.0	1.0	2.0	**8.0**	**66.7%**	**30.0%**	2.0	2.0	2.0	**6.0**	**66.7%**	**6.7%**	**81.7%**	**$844,379**	This alternative relocates the existing intake on Anglins Creek to a point where it is not influenced by the Meadow River. The ability of Anglins Creek to meet system needs is not documented and requires further study
Interconnect	3.0	1.0	**4.0**	**66.7%**	**30.0%**	2.2	2.5	2.7	2.3	**9.7**	**80.8%**	**36.4%**	3.0	3.0	2.0	**8.0**	**88.9%**	**8.9%**	**75.3%**	**$7,027,000**	Summersville has sufficient capacity to provide Wilderness with ADF
Treated water storage	3.0	2.0	**5.0**	**83.3%**	**37.5%**	1.6	1.5	2.3	2.7	**8.1**	**67.5%**	**30.4%**	3.0	2.5	2.0	**7.5**	**83.3%**	**8.3%**	**76.2%**	**$1,986,000**	Tank would be located on acquired property across highway 41.
Raw Water Storage	3.0	2.0	**5.0**	**83.3%**	**37.5%**	2.4	3.0	2.3	2.7	**10.4**	**86.7%**	**39.0%**	3.0	2.5	2.0	**7.5**	**83.3%**	**8.3%**	**84.8%**	**$1,986,000**	Tank would be located on acquired property across highway 41.

Table 5. Alternatives Table

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility
Economic Criteria									
What is the total current budget year cost to operate and maintain the PWSU (current budget year)?		$915,000.00		$915,000.00		$915,000.00		$915,000.00	
O and M Costs	Describe the major O&M cost requirements for the alternative?	Electricity for pumping; maintenance; screen cleaning	3	Labor and materials to maintain pumps	3	Electricity for transfer pumps, labor, maintenance; does not include water flushed	3	Electricity for transfer pumps, labor, recurring maintenance	3
	What is the incremental cost ($/gal) to operate and maintain the alternative?	$1,790.70	3	$9,012.00	3	$19,187.74	3	$21,267.74.	3
	Cost comparison of the incremental O&M cost to the current budgeted costs (%)	0.20%	3	0.98%	3	2.10%	3	2.32%	3
O and M-Feasibility Score			***3.0***		***3.0***		***3.0***		***3.0***
Describe the capital improvements required to implement the alternative.		Intake structure and pump station; 800 ft. of 6" diameter pipe		Piping and pump station for supply from Summersville		1.2 MG ground storage tank and transfer pumps		1.2 MG ground storage tank and transfer pumps	
Capital Costs	What is the total capital cost for the alternative?	$844,380	3	$7,683,000	1	$2,119,000	2	$2,119,000	2
	What is the annualized capital cost to implement the alternative, including land and easement costs, convenience tap fees, etc. ($/gal)	$54,435.36	3	$495,000.00	1	$136,620.56	2	$136,620.56	2
	Cost comparison of the alternatives annualized capital cost to the current budgeted costs (%)	5.95%	3	54.10%	1	14.93%	2	14.93%	2
Capital Cost-Feasibility Score			***3.0***		***1.0***		***2.0***		***2.0***

Table 5. Alternatives Table (Cont'd)

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility
Technical Criteria									
Permitting	Provide a listing of the expected permits required and the permitting agencies involved in their approval.	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2
	What is the timeframe for permit approval for each permit?	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2
	Describe the major requirements in obtaining the permits (environmental impact studies, public hearings, etc.)	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2
	What is the likelihood of successfully obtaining the permits?	There may not be sufficient capacity in Anglins Creek to support a permit	1	No identified barriers	2	Potential for nonrevenue water issues	1	No identified barriers	3
	Does the implementation of the alternative require regulatory exceptions or variances?	None identified	3	None identified	3	In order to avoid flushing water additional studies may be required to support a variance from the 20% turnover rule	1	None Identified	3
Permitting-Feasibility Score			***2.0***		***2.2***		***1.6***		***2.4***
Flexibility	Will the alternative be needed on a regular basis or only used intermittently?	Intermittent	3	Intermittent	2	Full time operations	2	Full time operations; with ability for intermittent	3
	How will implementing the alternative affect the PWSU's current method of treating and delivering potable water including meeting Safe Drinking Water Act regulations? (ex. In the case of storage, will the alternative increase the likelihood of disinfection byproducts?)	No changes in treatment or water delivery with the backup source	3	No identified changes	3	With the requirement to turn over 20% of tank volume the system will be required to flush water during days when demands are low.	1	There will be additional operating requirements for the new equipment but the existing treatment process will be minimally affected.	3
Flexibility-Feasibility Score			***3.0***		***2.5***		***1.5***		***3.0***

Table 5. Alternatives Table (Cont'd)

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility
Resilience	Will the alternative provide any advantages or disadvantages to meeting seasonal changes in demand?	There are some concerns about the true capacity of Anglins Creek	1	Yes. Interconnect will provide back up in other emergency situations	3	Yes; only short term	2	Yes; only short term	2
	How resistant will the alternative be to extreme weather conditions such as drought and flooding?	There are some concerns about the true capacity of Anglins Creek	1	May act as an additional source of supply	2	Yes; only short term	2	Yes; only short term	2
	Will the alternative be expandable to meet the growing needs of the service area?	There are some concerns about the true capacity of Anglins Creek	1	Yes	3	Yes	3	Yes	3
Resilience-Feasibility Score			***1.0***		***2.7***		***2.3***		***2.3***
Institutional Requirements	Identify any agreements or other legal instruments with governmental entities, private institutions or other PWSU required to implement the alternative.	None identified	2	Emergency Usage agreement with Summersville	2	None identified	3	None Identified	3
	Are any development/planning restrictions in place that can act as a barrier to the implementation of the alternative?	None identified	2	None Identified	3	None identified	3	None Identified	3
	Identify potential land acquisitions and easements requirements.	Easement and/or property purchase for intake and pump stations	2	Easement and/or property purchase for pump station.	2	The tank site would need to be acquired from its current owner	2	The tank site would need to be acquired from its current owner.	2
Institutional Requirements-Feasibility Score			***2.0***		***2.3***		***2.7***		***2.7***
Environmental Criteria									
Environmental Impacts	Identify any environmentally protected areas or habitats that might be impacted by the alternative.	Intake structure is likely to require surveys for T&E species	2	None identified	3	None identified	3	None Identified	3
Environmental Impacts-Feasibility Score			***2.0***		***3.0***		***3.0***		***3.0***
Aesthetic Impacts	Identify any visual or noise issues caused by the alternative that may affect local land uses?	None identified	2	None identified	3	The storage tank would be a large structure in an area with few comparably sized structures	2	The storage tank would be a large structure in an area with few comparably sized structures	2
	Identify any mitigation measures that will be required to address aesthetic impacts?	None identified	2	None identified	3	None identified	3	None identified	3
Aesthetic Impacts-Feasibility Score			***2.0***		***3.0***		***2.5***		***2.5***

Table 5. Alternatives Table (Cont'd)

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility
Stakeholder Issues	Identify the potential stakeholders affected by the alternative.	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2
	Identify the potential issues with stakeholders for and against the alternative.	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2
	Will stakeholder concerns represent a significant barrier to implementation (or assistance) of the alternative?	Possibly from an environmental perspective	2	No	2	No	2	No	2
Stakeholder Issues-Feasibility Score			***2.0***		***2.0***		***2.0***		***2.0***
Comments		This alternative relocates the existing intake on Anglins Creek to a point where it is not influenced by the Meadow River. The ability of Anglins Creek to meet system needs is not documented and requires further study		Summersville has sufficient capacity to provide Wilderness with ADF		Tank would be located on acquired property across highway 41.		Tank would be located on acquired property across highway 41.	

Table 6. Permitting Sub-Schedule

Permits Required							
Agency	**Permit**	**Back up Intake**	**Interconnect**	**Raw Water Storage**	**Treated Water Storage**	**Other**	**Notes**
WV Bureau Public Health	Construction	yes	yes	yes	yes		
USACOE(1)	404 Permit	yes	no	no	no		
Local/State Road Agency	ROW Utilization	yes	yes	yes	yes		

(1) US Army Corps of Engineers

Application Period Duration							
Agency	**Permit**	**Back up Intake**	**Interconnect**	**Raw Water Storage**	**Treated Water Storage**	**Other**	**Notes**
WV Bureau Public Health	Construction	90 days	90 days	90 days	90 days		
USACOE	404 Permit	180 days	NA	NA	NA		
Local/State Road Agency	ROW Utilization	90 days	90 days	90 days	90 days		

Application Requirements							
Agency	**Permit**	**Back up Intake**	**Interconnect**	**Raw Water Storage**	**Treated Water Storage**	**Other**	**Notes**
WV Bureau Public Health	Construction	Engineers Report; Construction Drawings; Specifications	Engineers Report; Construction Drawings; Specifications	Engineers Report; Construction Drawings; Specifications	Engineers Report; Construction Drawings; Specifications		
USACOE	404 Permit	Construction Drawings; Construction Plan	NA	NA	NA		
Local/State Road Agency	ROW Utilization	Construction Drawings	Construction Drawings	Construction Drawings	Construction Drawings		

Other Considerations							
Agency	**Permit**	**Back up Intake**	**Interconnect**	**Raw Water Storage**	**Treated Water Storage**	**Other**	**Notes**
WV Bureau Public Health	Construction	Need to document the ability of Anglins Creek to meet capacity requirements					
USACOE	404 Permit						
Local/State Road Agency	ROW Utilization		Bridge crossing	Road crossing to reach storage tank site	Road crossing to reach storage tank site		

Table 7. Stakeholders Sub-Schedule

List Concerns for Each Alternative by Stakeholder						
Stakeholder Group	**Back up Intake**	**Interconnect**	**Raw Water Storage**	**Treated Water Storage**	**Other**	**Notes**
Residential Customers	Cost impacts; Improved protection from contamination	Cost impacts; Improved protection from contamination	Aesthetic concerns; Cost impacts; Improved protection from contamination	Aesthetic concerns; Cost impacts; Improved protection from contamination		Neutral response
System Owner	Additional operations; Cost impacts	Additional operations; Cost impacts	Additional operations; Cost impacts	Operational issue with storage turnover; Cost impacts		Positive to meet regulations and improve service; Negative for treated water storage
Industrial/ Commercial Customers	Cost impacts; Improved service and protection from contamination	Cost impacts; Improved service and protection from contamination	Cost impacts; Improved service and protection from contamination	Cost impacts; Improved service and protection from contamination		Neutral to positive response; less sensitive to costs over improved service
Environmental Interest Groups	Minor	Minor	Minor	Minor		Average to negative response

CONCLUSION

Based on the analysis and findings presented Tetra Tech offer the following conclusions:

1. The existing storage in Wilderness is currently above the 2 day minimum requirement. Based on conversations with the Wilderness PWS staff, the effects of a water supply problem would first be felt in the higher elevations of the service area near the Mount Lookout tank. The recently installed second Mount Lookout tank will provide additional storage to this area.

2. Based on the scoring system, raw storage and the backup intake on Anglins Creek are the most feasible source water alternatives for the Wilderness PSD and should be considered for further evaluation. The backup intake on Anglins Creek is contingent upon verifying there is reliable creek flow to meet demands. **Figures 2 and 3** provide conceptual drawings of the alternatives while **Tables 8 and 9** provide details on the opinion of cost.

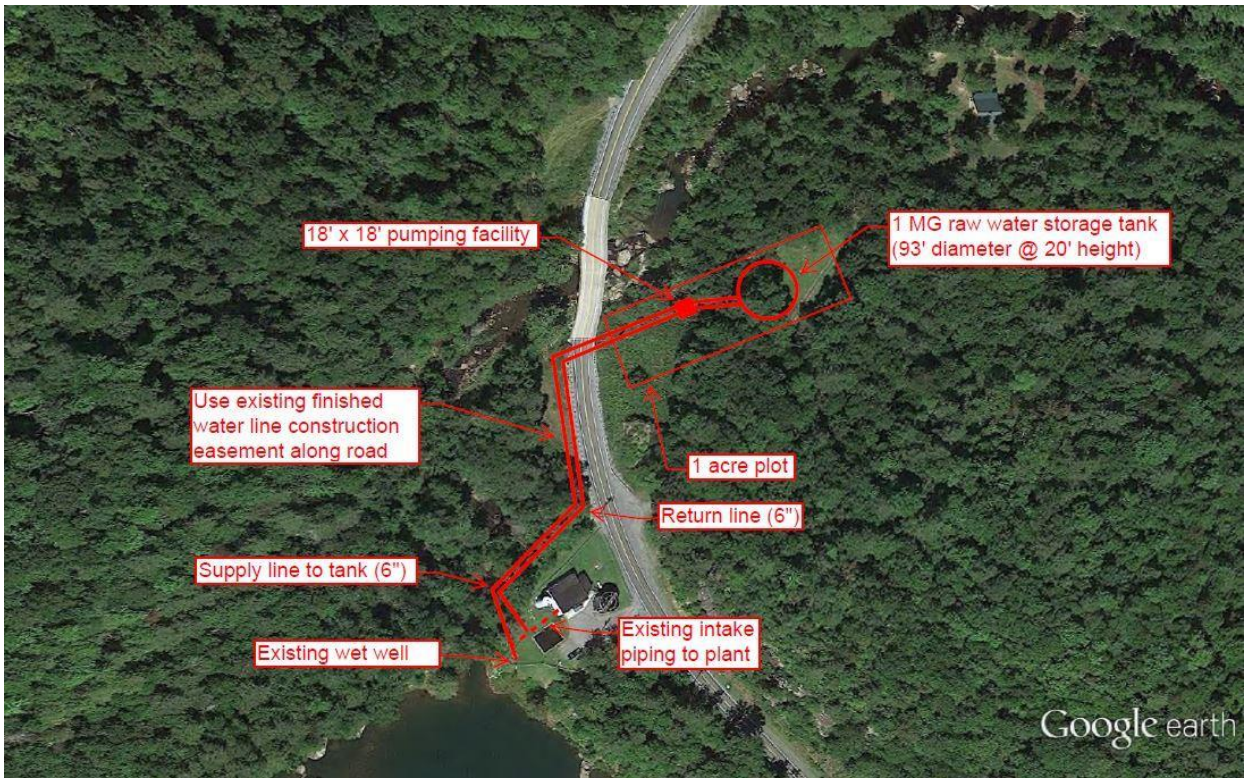

Figure 2. Wilderness PSD Raw Water Storage Conceptual Drawing

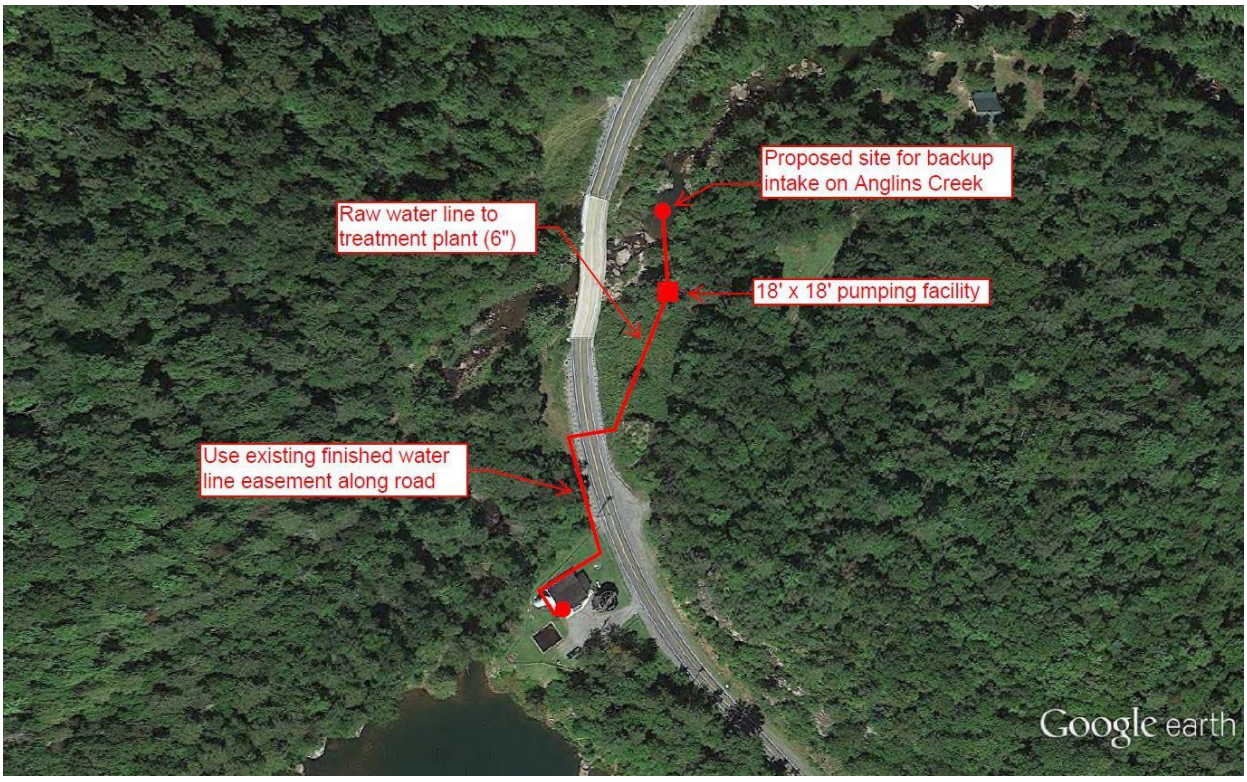

Figure 3. Wilderness PSD Backup Intake Conceptual Drawing

Table 8. Raw Water Storage – Opinion of Cost

Facility Description/Capital Cost				
Item	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**
Raw Water Ground Storage Tank	1	EA	$972,000	$972,000
Raw Water Transfer Pump	3	EA	$20,000	$60,000
Pre-fab metal pump enclosure	1	EA	$60,000	$60,000
Piping from wet well to tank	823	FT	$49	$40,327
Piping from tank to sedimentation basin	823	FT	$49	$40,327
Electrical and Controls	1	EA	10%	$117,265
Site Work	1	LS	$120,000	$120,000
			Subtotal	**$1,409,919**
			Contingency @ 30%	$422,976
			Eng. Permit, etc. @ 15%	$211,488
			Land Acquisition	$74,821
Total Raw Water Storage Capital Costs				**$2,119,204**

Table 9. Backup Intake: Opinion of Cost

Facility Description/Capital Cost				
Item	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**
Intake Screen 10"	1	EA	$2,000	$2,000
Flow control/Sluice Gate	1	EA	$20,000	$20,000
Intake Piping - 6" RCP	90	FT	$137	$12,330
Piping to plant - 6" DIP	525	FT	$49	$25,725
Raw Water Intake Pumps	2	EA	$100,000	$200,000
Pre-Cast Vault for raw water pump station	1	EA	$100,000	$100,000
Electrical and Controls	1	EA	10% of costs	$30,000
Jack and bore	1	EA	$24,000	$24,000
Site Work	1	LS	$120,000	$120,000
			Subtotal	**$534,055.00**
			Contingency @ 30%	$160,216.50
			Eng. Permit, etc. @ 15%	$80,108.25
			Land Acquisition and Easements	$70,000
Total Backup Intake Capital Costs				**$844,380**

APPENDIX E. SUPPORTING DOCUMENTATION

E-1. Protection Team Meeting

Date: 11/17/2015

Location: Wilderness PSD Office, Mt. Nebo, WV

Participants:

- On Tuesday November 17, 2015 the Source Water Protection Team for Wilderness PSD met to discuss the draft of the updated Source Water Protection Plan. Three of the protection team members (Chris Farrish, Rodney Boyce, and Mike Judy) were unable to attend the meeting at the last minute, but will be given an opportunity to comment on the draft plan and offer their comments in the future. All three expressed their interest in participating on the team but were unable to make it to the meeting. Mike Judy left the position of Director shortly after the protection team meeting.
- Russell presented the draft plan and mapping information to the team and they discussed the potential contaminants as well as some of their priority sites.
    - The team requested that we use the 2015 PSC Annual report for the population served by the utility.
    - The team corrected the number of source water protection areas from 1 to 2, for both the Meadow River and Anglins Creek intakes.
    - The team suggested that we include the new 100,000 gallon Mt. Lookout tank, which was recently completed on the same site as the original Mt. Lookout Tank.
    - The team discussed the wastewater sludge disposal site that has been a problem for the water system in the past. The chief operator does not know the current status of the operation but expressed hope that the permit for the land application does not get approved again. The site has a history of incorrect application methods on recently logged land, which he has called to attention in the past. They suggested we rename the priority Wastewater Sludge Land Application.
    - The team suggested that we prioritize two additional points: R-238 Russellville Bridge over the Meadow River, and R-183 and PSSC #5 the American Timber Marketing Group timber staging area.
    - The communities served by the utility are the same as those reported in the 2015 PSC Annual report, and should be used in the SWPP.
    - The team suggested that we do the public meeting at one of the PSD Board Meetings, which are scheduled for the third Thursday of each month. The team will wait on TT staff to initiate the meeting once the draft is ready to present.

E-2. List of Regulated Databases

In addition to PSSC that have been identified by the WVBPH and local efforts, water systems should consider data available from regulatory agencies, such as the US Environmental Protection Agency (USEPA) and the WV Department of Environmental Protection (WVDEP). The follow presents examples of regulatory program databases that should be considered.

USEPA

CERCLIS:

The Superfund program was created by the Comprehensive Environmental Response, Compensation, and Liability Act, amended by the Superfund Amendments and Reauthorization Act. The acts established authority for the government to respond to the release/threat of release of hazardous wastes, including cleanup and enforcement actions. Long-term cleanups at National Priority List sites last more than a year while short term /emergency cleanups are usually completed in less than a year. CERCLIS is a database used by the USEPA to track activities conducted under its Superfund program. CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA. Sites are investigated because of a potential for releasing hazardous substances into the environment are added to the CERCLIS inventory. USEPA learns of these sites through notification by the owner, citizen complaints, state and local government identification, and investigations by USEPA programs other than Superfund. Specific information is tracked for each individual site.

NPDES:

The National Pollutant Discharge Elimination System (NPDES) database identifies facilities permitted for the operation of point source discharges to surface waters in accordance with the requirements of Section 402 of the Federal Water Pollution Control Act. Point sources are discrete conveyances such as pipes or man-made ditches. Industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. The NPDES permit program controls water pollution by regulating point sources that discharge pollutants into public waters.

RCRA:

This database has records for all hazardous waste, generators, and transporters as defined by the Resource Conservation Recovery Act (RCRA). Hazardous waste as defined by RCRA is waste material that exhibits ignitability, corrosivity, reactivity, or toxicity. Hazardous waste comes in many shapes and forms. Chemical, metal, and furniture manufacturing are some examples of processes that create hazardous waste. RCRA tightly regulates all hazardous waste from "cradle to grave" (i.e., from manufacture to disposal).

TRI:

The Toxics Release Inventory (TRI) is a publicly available USEPA database that contains information on toxic chemical releases and other waste management activities reported annually by certain covered industry groups as well as federal facilities. This inventory was established under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) and expanded by the Pollution Prevention Act of 1990.

WVDEP

Abandoned Mine Sites:

Abandoned mine features compiled by the Office of Abandoned Mine Lands and Reclamation (AMLR) of the WVDEP. The AMLR eliminates damage that occurred from mining operations prior to August 3, 1977 and is funded by the AML fund. It corrects hazardous conditions and reclaims abandoned and forfeited mine sites. Typical AML features include high walls, portals, refuse piles, and mining structures such as tipples.

AST:

Above Ground Storage Tanks are regulated by the WVDEP and are subject to specific standards. Any facility using an AST should contact the WVDEP Water and Waste Management office for current requirements and further advice at 304-926-0495 or http://www.dep.wv.gov/WWE/abovegroundstoragetanks/Pages/default.aspx .

Coal Dams:

Point and polygonal mining related impoundments regulated by the WVDEP Division of Mining and Reclamation (DMR).

LUST:

The WVDEP became the lead agency for administering the Leaking Underground Storage Tank (LUST) Program with the USEPA's authorization in September 1997. Since then, the WVDEP has overseen the cleanup of released regulated substances, primarily petroleum products. Such releases can originate from overfilling, spilling, or leaking tanks and piping. To report a release from an underground storage tank system, contact the Office of Environmental Remediation at 304-238-1220, ext. 3506. After hours releases should be reported to the statewide emergency spill line at 800-642-3074.

Solid Waste Facilities:

Municipal and non-municipal waste landfills and waste transfers stations are regulated by the WVDEP Division of Waste Management.

Oil and Gas Wells:

The Office of Oil and Gas maintains records on active and inactive oil and gas wells. It also manages the Abandoned Well Plugging and Reclamation Program.

UIC:

The Underground Injection Control (UIC) program is designed to ensure that fluids injected underground will not endanger drinking water sources. The Division of Water and Waste Management regulates Class 5 wells. These wells include agriculture drainage wells, improved sinkholes, industrial disposal wells, storm water wells and septic systems that have the capacity to serve 20 or more people. The following state codes address UIC regulations; 47CSR9, 47CSR13 and 47CSR55. The Division of Mining and Reclamation oversees all mining UIC permits.

UST:

The purpose of the Underground Storage Tank (UST) Section is to regulate underground storage tanks that contain petroleum or hazardous substances to determine compliance with state rules and federal regulations. West Virginia has had full program approval from USEPA since February 1988.

Confidentiality Statement

I have reviewed and understand the requirements to maintain PSSC data in a confidential manner (64CSR3). While I may discuss PSSCs in general terms, I understand that I am not permitted to release exact locations, characteristics or quantities of contaminants to the general public.

Wilderness PSD Designees:

Name	Signature	Date
John Scott Rader		11-17-15
Pat McCutcheon		11-17-15
Debbie Gilbert		11/17/15
Todd A Dean		11/17/15

Tetra Tech, Inc.
803 Quarrier Street, Suite 400, Charleston, WV 25301
Tel 304-414-0054 Fax 304-720-2334 tetratech.com

GET INVOLVED IN SOURCE WATER PROTECTION

Wilderness PSD has developed a Source Water Protection Plan to comply with recent state legislation regarding drinking water. All public water utilities that use surface water sources must complete and submit a plan by July 1, 2016.

Source Water Protection Plans are valuable tools to help any public water system plan for and manage water emergencies. Development of these plans relies on the involvement of water utility personnel, local government officials, emergency managers, health department representatives, and local community leaders.

Your water system is committed to informing and engaging the public during development and implementation of this plan. You are invited to visit the Wilderness PSD office to review the draft of the plan before it is submitted. Now is your chance to provide your input.

To get involved in the planning process, please contact the Wilderness PSD Office no later than April 22, 2016

Phone: 304-872-1598
Email: scott.wpsd@gmail.com

Tetra Tech, Inc.
803 Quarrier Street, Suite 400, Charleston, WV 25301
Tel 304-414-0054 Fax 304-720-2334 tetratech.com

Do your part to keep contaminants out of our children's source water!

Contaminants

Cleaning Products

Automotive Products

Fuel Oil

Furniture Strippers

Oil-based Paints

Sewage

Lawn and Garden Products

Sediments

Pharmaceuticals

Source Water Links

www.wvdhhr.org/oehs/eed/swap/
www.epa.gov/safewater/index.html
www.epa.gov/watersense/
http://orsanco.org

For Kids

www.epa.gov/safewater/kids/index.html
www.epa.gov/watersense/kids/index.html
www.groundwater.org/kids/

Contacts

WV Department of Health and Human Resources
Source Water Assessment and Protection Program
350 Capitol Street, Room 313
Charleston, WV 25301-3713
phone: (304) 558-2981
fax: (304) 558-4322
e-mail: EEDSourceWaterProtection@wv.gov

Wilderness Public Service District
589 Riviera Road
Mout Nebo, WV 26679
304-872-1598
scott.wpsd@gmail.com

Do Your Part

Protect Your Source Water

Protect Your Health

TETRA TECH

Prepared by Tetra Tech
In cooperation with the WVDHHR Source Water Assessment and Protection Program

Drinking water is essential for life. Learn what you can do to protect your drinking water sources.

Wilderness PSD treats water from both the Meadow River and Anglins Creek using conventional treatment methods. The watersheds for these streams contain logging operations, highways and railroads, and other potential threats. There are many ways you can help minimize impacts from these activities on your source of drinking water.

Making choices to protect and conserve the source of your drinking water will help keep you, your family, and neighbors safe and healthy now and in the future.

Do Your Part to Protect Source Water

- ✓ Recycle used oil and other automotive products at a service center. Don't pour them on the ground or down storm drains. Storm drains can lead directly to your source water.

Fix leaks from your automobile and clean up spills.

Apply fertilizers and pesticides as directed. Consider natural alternatives to chemicals.

Don't flush pharmaceuticals. Dispose by mixing with coffee grounds or kitty litter, sealing in a container, and placing in the trash. Organize a collection day with a pharmacy and local police department.

Take unwanted household chemical waste, such as cleaners, oils, and paints to proper waste collection sites. Don't dump down your sink, toilet, or storm drains. Consider organizing a collection day in your community.

Check for leaks at heating fuel tanks and install pads to catch accidental leaks or spills.

Report unused water wells to your utility or WVDHHR.

Inspect your septic system regularly and pump every 5-10 years.

Do Your Part to Conserve Source Water

- ✓ Turn off the water when you brush your teeth and take shorter showers.

Wash full loads of clothes and dishes.

Don't use your toilet to flush trash.

- ✓ Fix leaking faucets, toilets, and lines. Consider installing toilets, faucets, and appliances designed to save water.

Water your lawn and garden in the morning. Consider installing a rain barrel at your downspouts to collect rain to water your lawn and garden, instead of using treated water.

Use native plants in landscape that don't need extra watering. Use mulch to hold moisture.

Don't let your garden hose run when washing your car.

Don't panic if you are asked to conserve during a drought. Your utility will respond to water shortages based on your normal water use. Running extra water in your home during a drought will make it more difficult to respond to the water shortage.

Conserving water saves on your monthly bill now. Protecting your source water will save on treatment costs later.