Source Water Protection Plan
Town of Cedar Grove Water Department

PWSID 3302009

Kanawha County

June 2016

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In cooperation with the Town of Cedar Grove Water Department

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

Signature of responsible party or designee authorized to sign for water utility:

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Title of Authorizing Signatory:

6/24/2016

Date of Submission:

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APPENDICES

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 the Town of Cedar Grove Water Department 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, the Town of Cedar Grove Water Department 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 the Town of Cedar Grove Water Department 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

The Town of Cedar Grove Water Department 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 the Town of Cedar Grove Water Department

Administrative office location:		302 Alexander St. Cedar Grove, WV 25039	
Is the system a public utility, according to the Public Service Commission rule?		Yes; Community Public Water System	
Date of Most Recent Source Water Assessment Report:		May 2004	
Date of Most Recent Source Water Protection Plan:		March 2010	
Population served directly:		According to the 2015 PSC Annual Report, the Cedar Grove Water Department directly serves 449 total customers or approximately 1,122 people.*	
Bulk Water Purchaser Systems:	**System Name**	**PWSID Number**	**Population**
	Glasgow	-	362 Customers (905 people)*
	East Bank	-	404 Customers (1,010 people)*
Total Population Served by the Utility:		Cedar Grove serves a total population of approximately 3,037 people (1,215 customers).	
Does the utility have multiple source water protection areas (SWPAs)?		No	
How many SWPAs does the utility have?		1	

*Population served is estimated by multiplying the number of customers by 2.5.

5.0 WATER TREATMENT AND STORAGE

As required, the Town of Cedar Grove Water Department 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 the Town of Cedar Grove Water Department 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. Town of Cedar Grove Water Treatment Information

Water Treatment Processes (List All Processes in Order)	Water treatment processes include coagulation, flocculation, settling, filtration, disinfection and fluoridation.
Current Treatment Capacity (gal/day)	The current treatment capacity is approximately 1,000,000 gallons per day.
Current Average Production (gal/day)	The plant produces an average of 790,000 gallons per day.
Maximum Quantity Treated and Produced (gal)	The maximum quantity of water that was produced in a single day in the last year was 1,000,000 gallons.
Minimum Quantity Treated and Produced (gal)	The minimum quantity of water that was produced in a single day in the last year was 520,000 gallons.
Average Hours of Operation	The treatment plant is staffed and operated an average of 18 hours per day.
Maximum Hours of Operation in One Day	The maximum hours of operation in a single day in the last year was 24 hours.
Minimum Hours of Operation in One Day	The minimum hour of operation in a single day in the last year was 11-12 hours.
Number of Storage Tanks Maintained	Cedar Grove maintains 2 treated water storage tanks. In addition, East Bank has 1 tank and Glasgow has 2 tanks.
Total Gallons of Treated Water Storage (gal)	The total treated water storage capacity, including the East Bank and Glasgow tanks, is around 594,000 gallons.
Total Gallons of Raw Water Storage (gal)	Cedar Grove does not have any raw water storage.

Table 3. Town of Cedar Grove 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)
Raw Water Intake	-	Kanawha Intake	Raw water intake pump situated on bottom of river with several pipes affixed across opening to prevent large debris from entering intake pipe.	Kanawha River	The intake was originally constructed around 1945 and modified in 1980.	Primary	Active

Table 4. Town of Cedar Grove 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. The width of the zone of critical concern is 1,000 feet measured horizontally from each bank of the principal stream and 500 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 1,000 feet measured horizontally from each bank of the principal stream and 500 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 covers 8,609 square miles
River Watershed Name (8-digit HUC)	Lower Kanawha River Watershed (05050008)
Size of Zone of Critical Concern (Acres)	The ZCC covers 19,973 acres.
Size of Zone of Peripheral Concern (Acres) (Include ZCC area)	The ZPC covers 53,619 acres.
Method of Delineation for Groundwater Sources	N/A
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 the Town of Cedar Grove Water Department 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 potential sources of significant contamination. 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.

The Town of Cedar Grove Water Department 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
James Hudnall	Community of Cedar Grove	Mayor	[redacted]	-
Kenneth Barton	Cedar Grove Municipal Water	WTP Chief Operator	304-595-2991	-
James Confere	Cedar Grove Volunteer Fire Department	-	[redacted]	-
Michael D. Coleman	Cedar Grove Volunteer Fire Department	Chief	[redacted]	-
John Qualls	Town of Glasgow	-	[redacted]	-
Robert Burdette	Cedar Grove Municipal Water	Operator	304-595-2991	-
Wayne Armstrong	Town of Glasgow	Mayor	[redacted]	glasgowmayor@outlook.com
Clayton Young, Jr.	Community of Cedar Grove	Councilman	[redacted]	
Date of first protection Team Meeting		6/7/2016		
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:	The protection team for Cedar Grove first met on June 7, 2016 at city hall in Cedar Grove. Kenneth Barton arranged the meeting and contacted the potential team members. All recommended team members were present, except a representative of the county health department, who will be included in future planning efforts and will be provided a copy of the plan. A Tetra Tech representative presented the draft plan and accepted comments and questions from the team members. The attendance sheet and confidentiality agreement from this meeting are attached in **Appendix E. Supporting Documentation**. Later that same day, the water system also held a public meeting during the regularly scheduled city council meeting, which fulfilled the public outreach component of the source water planning process. More information about this meeting is 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 potential sources of significant contamination (PSSC) 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 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 from 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 the Town of Cedar Grove Water Department 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 local stakeholders in addition to 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.

The Town of Cedar Grove Water Department 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 the Town of Cedar Grove Water Department that do not already appear 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
-	-	-	-	-	-

8.3 PRIORITIZATION OF POTENTIAL 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.

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 Town of Cedar Grove Water Department 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

The Town of Cedar Grove Water Department 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. The Town of Cedar Grove Water Department has developed an implementation plan for the 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.

Table 8. Priority PSSCs or Critical Areas

PSSC or Critical Area	Priority Number	Reason for Concern
Sanitary Septic Systems, Home Aeration Units, Wastewater Treatment Systems and Overflows from Larger Sanitary Sewer Systems	1	Discharge from smaller, failing sanitary systems, as well as overflows from larger sanitary sewer systems such as the Glasgow Sewage Treatment Plant, can pose a possible contamination threat, including the introduction of fecal coliform into source water. E. coli testing has been problematic in the past.
Norfolk Southern and CSX Railroad Tracks	2	A section of railroad passes through the SWPA on both sides of the Kanawha River and potential spills or leaks are a concern, particularly Norfolk Southern Railroad tracks on the north side of the river. A recent spill from a railroad impacted water treatment plant production at another PWS in the same county.
Roadways, Including US Route 60	3	Sections of major roadway pass through the SWPA on both sides of river, and potential spills area concern given impact of recent spill from railroad.
Industry	4	Areas upstream of intake are heavily industrialized, includes extensive coal industry development. Surface water protection practices for local industries may not be known.
Future Development	5	Extent and type of future development, including potential impacts on source water, is not known at this time.
Vandalism	6	Vandals could damage facilities, including raw water system.

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 6 management strategies recommended in the existing plan. All of these priorities are still a concern for the water system. These are incorporated in this plan update and listed below along with the updated management strategies.	-	-	-	-
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 Cedar Grove 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	Local emergency planners have access to confidential chemical contaminant information in Tier II reports from facilities in the SWPA. The utility should coordinate with the local emergency planners to gain an understanding of potential contaminants to better prepare for a spill event. Utility staff will continue to communicate with these emergency services groups	Water utility staff and emergency response personnel.	Engage local emergency planners immediately and communicate	-	Minimal cost associated with staff time

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
	on a regular basis, especially when there is not an ongoing emergency. They will invite the local emergency planners to meet yearly as part of the Source Water Protection Team.		on a regular basis.		
Sanitary Septic Systems, Home Aeration Units, Wastewater Treatment Systems and Overflows from Larger Sanitary Sewer Systems	Support study and planning of sanitary sewer system extensions and upgrades along Kanawha River and tributaries upstream of intake to extend service to these areas and eliminate failing septic systems, home aeration units and wastewater treatment systems, and overflows from larger sanitary sewer systems. Raise awareness with city government and/or county commission for need for source water protection to increase support for proposed sanitary sewer system extensions and upgrades. Evaluate enhanced fecal coliform testing of surface water to better identify sources of fecal coliform contamination.	Community of Cedar Grove and utility staff	As necessary	-	Minimal cost associated with utility staff time. Enhanced testing costs can range from $1,000 and up depending on program. WVDHHR grant funds may be available.
Norfolk Southern and CSX Railroad Tracks	Promote better coordination of emergency response with local first responders, including raising awareness for the need to protect drinking water supplies. Meet with local public water system (St. Albans Municipal Utility Commission) to obtain input on their experience with addressing recent railroad spill, addressing media, emergency procedures, etc. Install signage just off railroad right-of-way) with emergency contact numbers. This would also help raise awareness of railroad personnel that they are traveling through a source water protection zone while providing them with a call number in an emergency.	Utility Staff/Town Council Member/	Ongoing Efforts	Work with local fire department and transportation department with spill response planning.	No direct cost. An ongoing annual effort is required. Typically $1,000 to $2,000. WVDHHR grant funds may be available.

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
Roadways, Including US Route 60 and State Route 61	Better coordination of emergency response with local first responders, including raising awareness for the need to protect drinking water supplies. Consider installing signage along US Route 60 with emergency contact numbers. This would also help raise awareness with motorists and truckers that they are traveling through a source water protection zone while providing them with a call number in an emergency.	Utility staff	Ongoing efforts	Work with local fire department and transportation department with spill response planning. Evaluate installing signage along State Route 61 or railroad on south side of river. Coordinate activities with Town of Pratt and other communities.	No direct cost. An ongoing annual effort is required.
Vandalism	Evaluate improving security, including adding security cameras at WTP and intake. Reinstall signage at intake, at visible spots to general public, identifying this as a source water area and warning that tampering with this installation is a federal offense, and potentially providing a notice regarding video surveillance. Include emergency contact numbers.	Chief operator/Utility staff	As necessary	-	Minimal cost associated with staff time to evaluate security. Signage could cost between $1,000 to $2,000. WVDHHR grant funds may be available.
Industry	Review public information on surface water protection practices, including results of sampling required by NPDES permit for industry to raise PWS staff awareness of surface water protection plan practices industries on the watershed.	PWS Chief Operator / Town Council Member	Ongoing	The West Virginia Department of Environmental Protection retains copies of protection plans that can be obtained through Freedom of Information Act requests.	Minimal (Freedom of Information Act charges, mileage).
Future Development	Raise awareness of city and/or county government by providing SWPA map and educational brochure, to help decision making with respect to future development. Evaluate what authority exists at city and/or county government regarding approval over development that could be a high risk to surface water resources.	Utility Staff	Ongoing	See Table 10 for information on educational brochure.	Depends on consultant and/or legal fees, and size and scope of effort.

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. The Town of Cedar Grove Water Department 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 Meeting	Cedar Grove held an informational meeting with local residents about source water protection efforts on June 7, 2016 during the regularly scheduled city council meeting. The meeting was held to increase awareness of the connection between land use and drinking water quality. A representative from Tetra Tech gave a presentation about the plan and was available to answer questions and take comments. Utility staff from Cedar Grove were also present to answer any questions. This meeting fulfilled a required part of the source water protection planning process.	Utility Staff/ Protection Team	June 7, 2016	The meeting was advertised for several days prior to the meeting by posting an announcement flyer around Cedar Grove on bulletin boards and in public places. The flyer that was used is attached in **Appendix E. Supporting Documentation**. The meeting sign-in sheet is also attached in **Appendix E**.	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.	Utility Staff	Within a year	The Source Water Collaborative has released an educational brochure building tool to assist with creating custom brochures targeting local decision makers. This tool is available at: http://www.yourwateryourdecision.org and may assist in community planning and development. There is also an example brochure attached in **Appendix E**.	Cost in brochure printing and mailing

Education and Outreach Strategy	Description of Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
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 can 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 for a plant tour to tie in with classroom materials.	Minimal costs. Would require time to coordinate, visit classroom and provide tour

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 the Town of Cedar Grove Water Department 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/). The Town of Cedar Grove Water Department has analyzed its ability to effectively respond to emergencies and this information is also provided in **Table 11**.

Table 11. Cedar Grove Water Shortage Response Capability*

Can the utility isolate or divert contamination from the intake or groundwater supply?	No
Describe the utility's capability to isolate or divert potential contaminants:	The utility does not employ diversion booms to isolate or divert contaminated waters and due to a stationary intake is unable to draw water from different elevations.
Can the utility switch to an alternative water source or intake that can supply full capacity at any time?	No
Describe in detail the utility's capability to switch to an alternative source:	The water system does not have any alternative sources of raw water at this time.**
Can the utility close the water intake to prevent contamination from entering the water supply?	Yes
How long can the intake stay closed?	23 hours (with treated water storage at capacity) 11 hours (with treated water storage at half capacity)
Describe the process to close the intake:	The intake can be shut off by closing a valve in the raw water line and turning off the raw water pumps. This process only takes a few minutes.**
Describe the treated water storage capacity of the water system:	Cedar Grove has two treated water storage tanks with a total capacity of 300,000 gallons. The water system also has access to one 125,000 gallon tank in East Bank and two tanks in Glasgow that total 169,000 gallons. The total usable treated water storage for the Cedar Grove Water Department is approximately 594,000 gallons.**
Is the utility a member of WVRWA Emergency Response Team?	The water system is a member of WV Rural Water, but not the emergency response team.**
Is the utility a member of WV-WARN?	No
List any other mutual aid agreements to provide or receive assistance in the event of an emergency:	Cedar Grove has informal mutual aid agreements with Glasgow and East Bank, both of which purchase water from Cedar Grove.**

*This information is from "Engineering Study for Contingency Planning", which was completed by Potesta and Associates, Inc. in 2016 for the Town of Cedar Grove. This document is attached in **Appendix D. Single Source Feasibility Study**.
**This information was updated after the completion of the Engineering Study.

11.2 OPERATION DURING LOSS OF POWER

The Town of Cedar Grove Water Department 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*

<table>
<tr><td colspan="2">What is the type and capacity of the generator needed to operate during a loss of power?</td><td colspan="2">Cedar Grove does not currently have an emergency generator at the water plant but would require a 200 kW 3-phase diesel generator at the plant. This would be capable of powering the intake pumps, treatment processes, and high service pumps.</td></tr>
<tr><td colspan="2">Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.</td><td colspan="2">No. The intake pumps are powered by the treatment plant and would not require a separate generator.</td></tr>
<tr><td colspan="2">Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.</td><td colspan="2">Yes. The treatment plant can be connected to a generator but would require electrical work to do so. The operators plan to rent a generator if necessary.</td></tr>
<tr><td colspan="2">Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.</td><td colspan="2">No. Cedar Grove does not have any distribution pumps and can serve all customers using the high service pumps, which are powered by the treatment plant.</td></tr>
<tr><td colspan="2">Does the utility have adequate fuel on hand for the generator?</td><td colspan="2">No. The water system does not have fuel storage on site currently, but would rent a generator that had a fuel tank.</td></tr>
<tr><td colspan="2" rowspan="2">What is your on-hand fuel storage and how long will it last operating at full capacity?</td><td>Gallons</td><td>Hours</td></tr>
<tr><td>N/A</td><td>N/A</td></tr>
<tr><td rowspan="5">Provide a list of suppliers that could provide generators and fuel in the event of an emergency:</td><td colspan="2">Supplier</td><td>Phone Number</td></tr>
<tr><td>Generator</td><td>Walker Caterpillar- Belle, WV</td><td>304-949-6400</td></tr>
<tr><td>Generator</td><td>Cummins Crosspoint- Cross Lanes, WV</td><td>304-769-1012</td></tr>
<tr><td>Fuel</td><td>Marmet Synfuel Dock- Marmet, WV</td><td>-</td></tr>
<tr><td>Fuel</td><td>Sunoco- Montgomery, WV</td><td>304-442-8900</td></tr>
<tr><td colspan="2">Does the utility test the generator(s) periodically?</td><td colspan="2">N/A</td></tr>
<tr><td colspan="2">Does the utility routinely maintain the generator?</td><td colspan="2">N/A</td></tr>
</table>

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:	Cedar Grove would plan to rent a generator during and extended power outage. They have not had to do this in the past, but could connect a generator to the plant with minor electrical work.

*This information was updated after the completion of the "Engineering Study for Contingency Planning", which was completed by Potesta and Associates, Inc. in 2016 for the Town of Cedar Grove. This document is attached in **Appendix D. Single Source Feasibility Study**.

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. The Town of Cedar Grove Water Department 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 the Town of Cedar Grove Water Department*

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; no population growth is expected in the next five years.
If not, describe the circumstances and plans to increase production capacity:	N/A

*This information is from "Engineering Study for Contingency Planning", which was completed by Potesta and Associates, Inc. in 2016 for the Town of Cedar Grove. This document is attached in **Appendix D. Single Source Feasibility Study**.

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 the Town of Cedar Grove Water Department PSC Annual Report.

Table 14. Water Loss Information*

Total Water Pumped (gal)		273,915,000
Total Water Purchased (gal)		0
Total Water Pumped and Purchased (gal)		273,915,000
Water Loss Accounted for Except Main Leaks (gal)	**Mains, Plants, Filters, Flushing, etc.**	18,000,000
	Fire Department	0
	Back Washing	18,760,000
	Blowing Settling Basins	0
Total Water Loss Accounted For Except Main Leaks (gal)		36,760,000
Water Sold- Total Gallons (gal)		114,289,000
Unaccounted For Lost Water (gal)		122,866,000
Water lost from main leaks (gal)		0
Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)		122,866,000
Total Percent Unaccounted For Water and Water Lost from Main Leaks (gal)		45%
If total percentage of Unaccounted for Water is greater than 15%, please describe any measures that could be taken to correct this problem:	The Town of Cedar Grove Water Department has a basic leak identification system whereby they contact rural water yearly to check the system for leaks using audio equipment. In addition, the Town of Cedar Grove Water Department hired Dunn Engineers, Inc. to prepare a Preliminary Engineering Report (PER) titled, “Water Distribution System Improvements,” revised March 2015	

*This information was taken from the 2015 Public Service Commission Annual Report for the Town of Cedar Grove Water Department. Some of the information was updated after the completion of the “Engineering Study for Contingency Planning”, which was completed by Potesta and Associates, Inc. in 2016 for the Town of Cedar Grove. This document is attached in **Appendix D**.

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.

The Town of Cedar Grove Water Department 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="2">Yes. Cedar Grove receives spill notifications from upstream water systems such as Armstrong PSD and Kanawha Falls PSD, as well as other upstream industries. The operator also receives spill notifications via email from the WV DHHR.</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">Yes</td></tr>
<tr><td colspan="2">Are you prepared to detect potential contaminants if notified of a spill?</td><td colspan="2">No</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="2">Laboratories</td></tr>
<tr><td>Name</td><td>Contact</td></tr>
<tr><td>REI Consultants</td><td>304-255-2500</td></tr>
<tr><td>WV Office of Lab Services</td><td>304-558-3530</td></tr>
<tr><td></td><td>ALS Environmental- South Charleston, WV</td><td>304-356-3168</td></tr>
<tr><td colspan="3">Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?</td><td>Yes</td></tr>
</table>

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?				Yes
Provide or estimate the capital and O&M costs for your current or proposed early warning system or upgraded system.	**Monitoring System**	**YSI EXO 2 (B-1)**	**Hach sc1000 (B-2)**	**Real Tech Full Scanning Monitoring System (B-3)**
	Capital	Total Capital Cost- $19,000	Approximate Capital Cost- $18,907	Approximate Capital Cost- $24,155
	Yearly O & M	Parts and calibration- Approximately $1,000 **D**ata management and telemetry- $1,000	Full service contract with Hach Service Representative- $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

*This information is from “Engineering Study for Contingency Planning”, which was completed by Potesta and Associates, Inc. in 2016 for the Town of Cedar Grove. This document is attached in **Appendix D. Single Source Feasibility Study**. Some of this information was updated after the completion of the engineering study.

12.0 SINGLE SOURCE FEASIBILITY STUDY

If a public utility's water treatment plant is supplied by a single–source intake in a surface water source 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 be required to 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. The guide provides several criteria to consider for each category, organized in a Feasibility Study Matrix. By completing the Feasibility Study Matrix, the Town of Cedar Grove Water Department has demonstrated 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

The Town of Cedar Grove Water Department 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. The Town of Cedar Grove Water Department 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 the Town of Cedar Grove Water Department 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

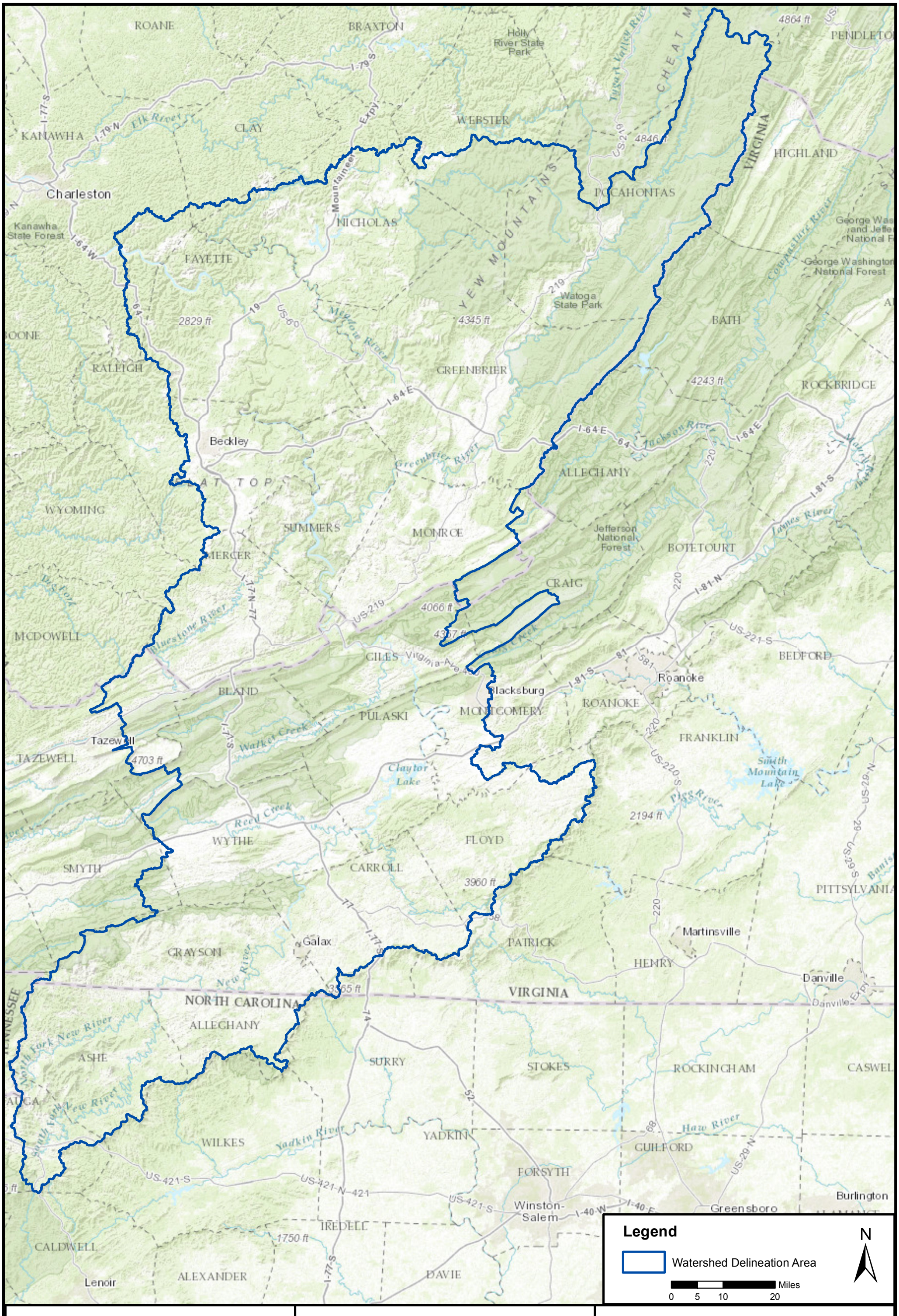
A public water utility must be prepared for any number of emergency scenarios and events that would require immediate response. It is imperative that information about key contacts, emergency services, and downstream water systems be posted and readily available in the event of an emergency. Elements 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 the Town of Cedar Grove Water Department'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



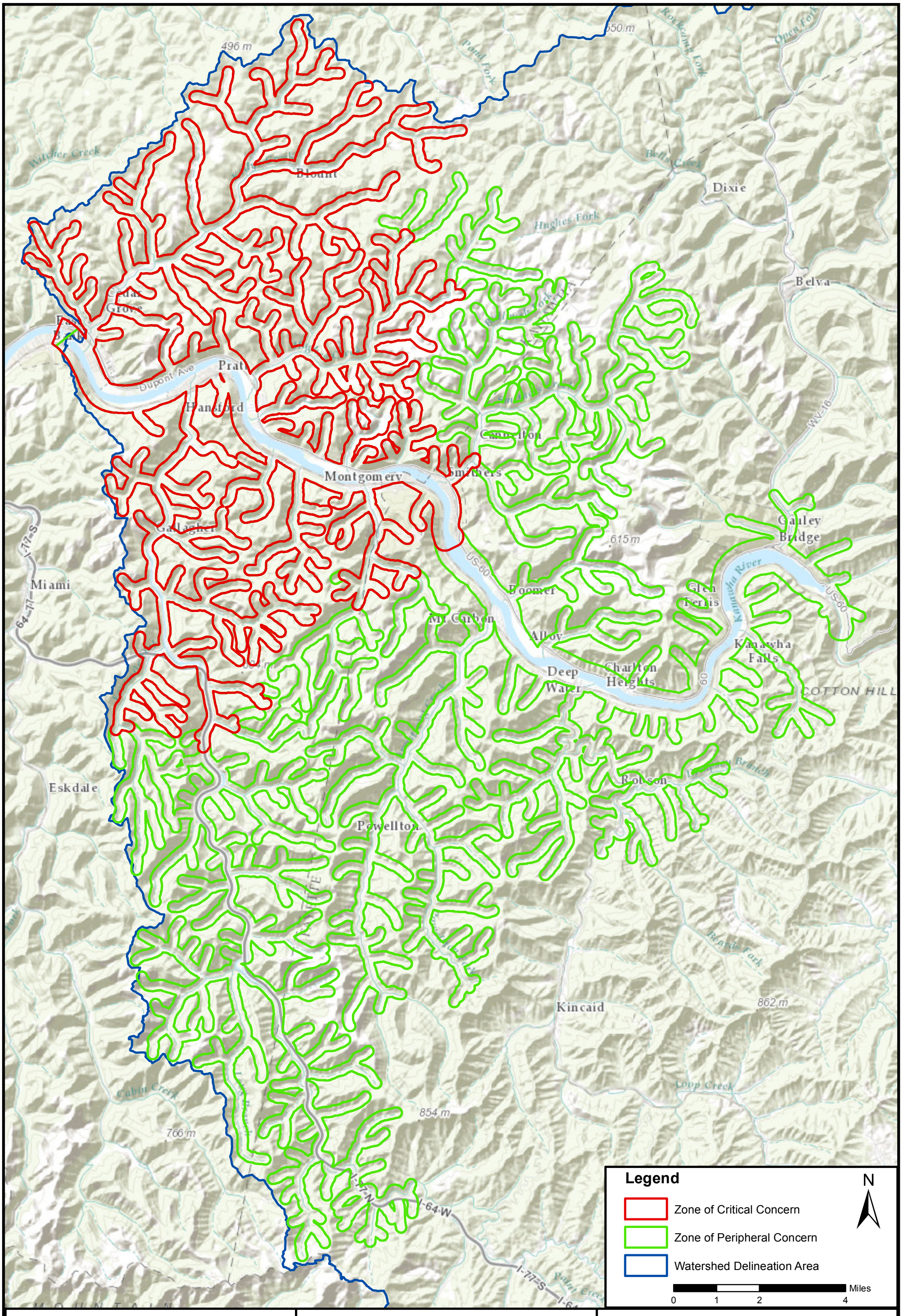
TETRA TECH
803 Quarrier Street, Suite 400
Charleston, WV 25301

Community of Cedar Grove
PWSID: WV3302009
Source Water Protection Plan

Figure A-1. Watershed Delineation Area

CREATED BY: CEM

DATE: 05/02/16



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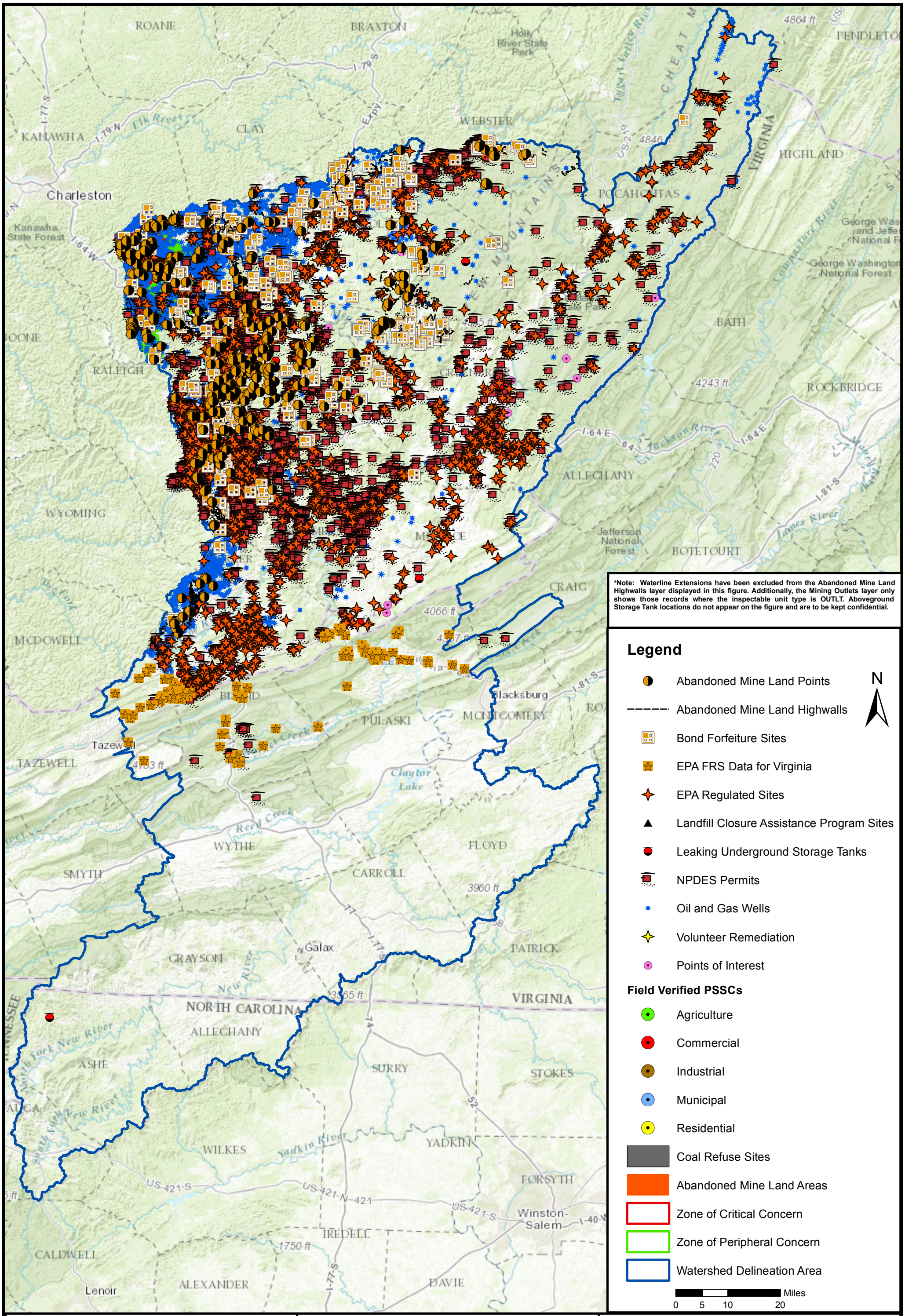
Community of Cedar Grove
PWSID: WV3302009
Source Water Protection Plan

Figure A-2. Zone of Critical Concern/ Zone of Peripheral Concern

CREATED BY: CEM

DATE: 05/02/16



*Note: Waterline Extensions have been excluded from the Abandoned Mine Land Highwalls layer displayed in this figure. Additionally, the Mining Outlets layer only shows those records where the inspectable unit type is OUTLT. Aboveground Storage Tank locations do not appear on the figure and are to be kept confidential.

Legend

- Abandoned Mine Land Points
- Abandoned Mine Land Highwalls
- Bond Forfeiture Sites
- EPA FRS Data for Virginia
- EPA Regulated Sites
- Landfill Closure Assistance Program Sites
- Leaking Underground Storage Tanks
- NPDES Permits
- Oil and Gas Wells
- Volunteer Remediation
- Points of Interest

Field Verified PSSCs

- Agriculture
- Commercial
- Industrial
- Municipal
- Residential
- Coal Refuse Sites
- Abandoned Mine Land Areas
- Zone of Critical Concern
- Zone of Peripheral Concern
- Watershed Delineation Area

N

Miles
0 5 10 20

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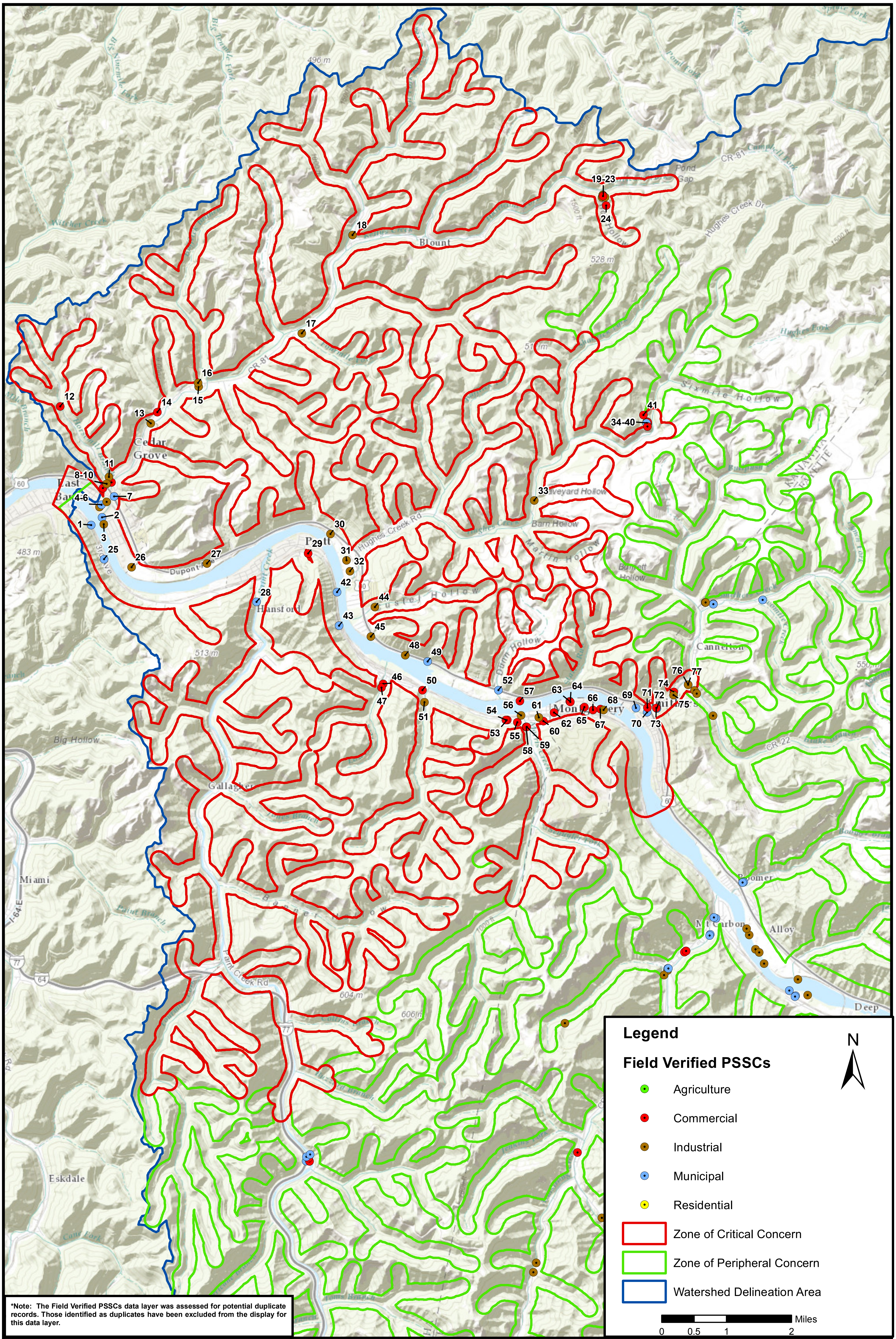
Source Water Protection Plan

Figure A-3. PSSCs in the Watershed Delineation Area

CREATED BY: CEM

DATE: 05/02/16



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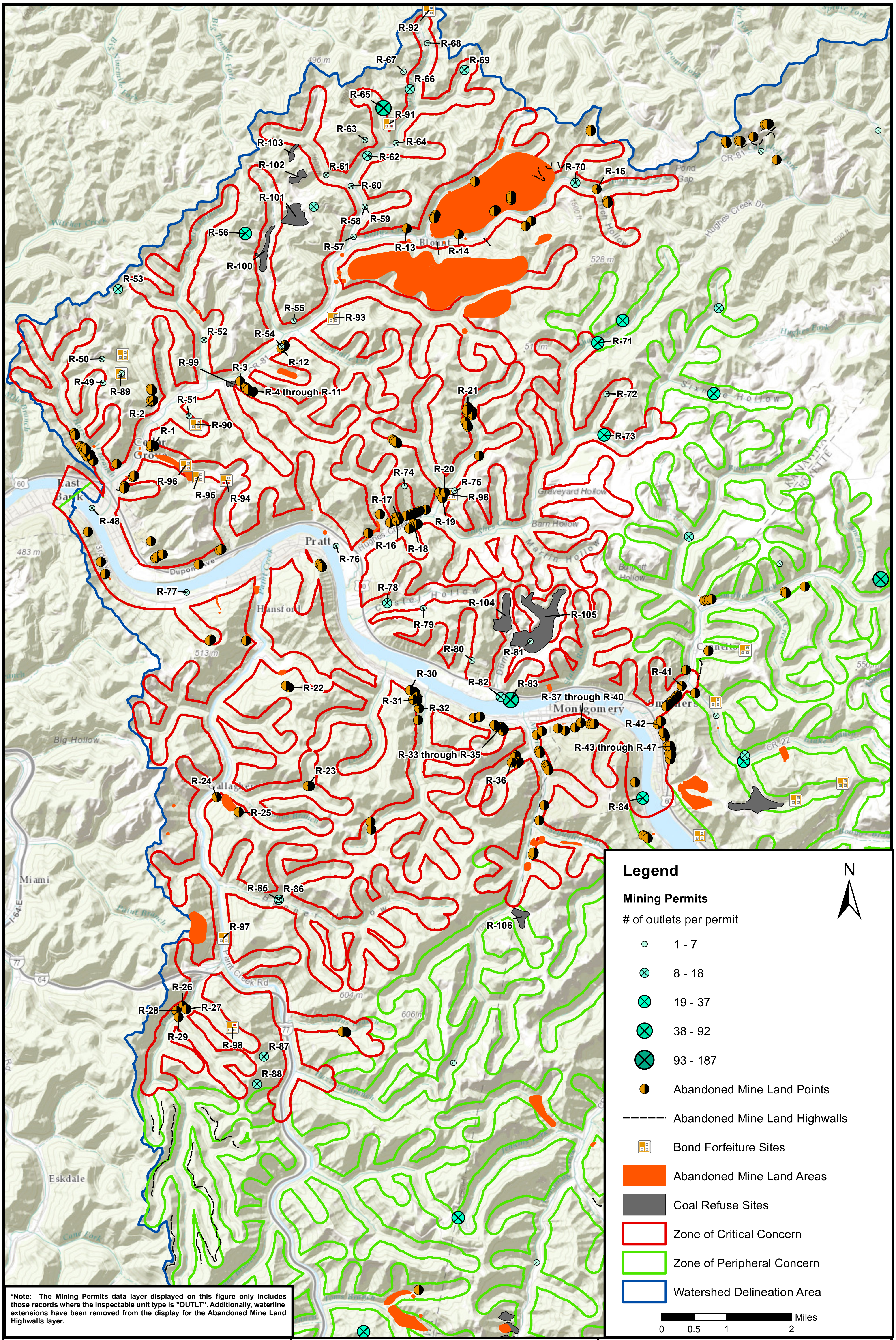
Community of Cedar Grove
PWSID: WV3302009
Source Water Protection Plan

Figure A-4. Field Verified PSSCs

CREATED BY: CEM | DATE: 05/24/16



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R-12
R-99
R-3
R-49
R-89
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R-29
R-98
R-87
R-88
Cedar Grove
East Bank
Pratt
Hansford
Montgomery
Smithers
Gallagher
Miami
Eskdale
Dupont Ave
Paint Creek Rd
Big Hollow
Graveyard Hollow
Barn Hollow
Martin Hollow
Sixmile Hollow
Pond Gap
Hughes Creek Dr
CR-81
CR-22
KANAWHA
FAYETTE
Legend
Mining Permits
# of outlets per permit
1 - 7
8 - 18
19 - 37
38 - 92
93 - 187
Abandoned Mine Land Points
Abandoned Mine Land Highwalls
Bond Forfeiture Sites
Abandoned Mine Land Areas
Coal Refuse Sites
Zone of Critical Concern
Zone of Peripheral Concern
Watershed Delineation Area
N
0
0.5
1
2
Miles

*Note: The Mining Permits data layer displayed on this figure only includes those records where the inspectable unit type is "OUTLT". Additionally, waterline extensions have been removed from the display for the Abandoned Mine Land Highwalls layer.

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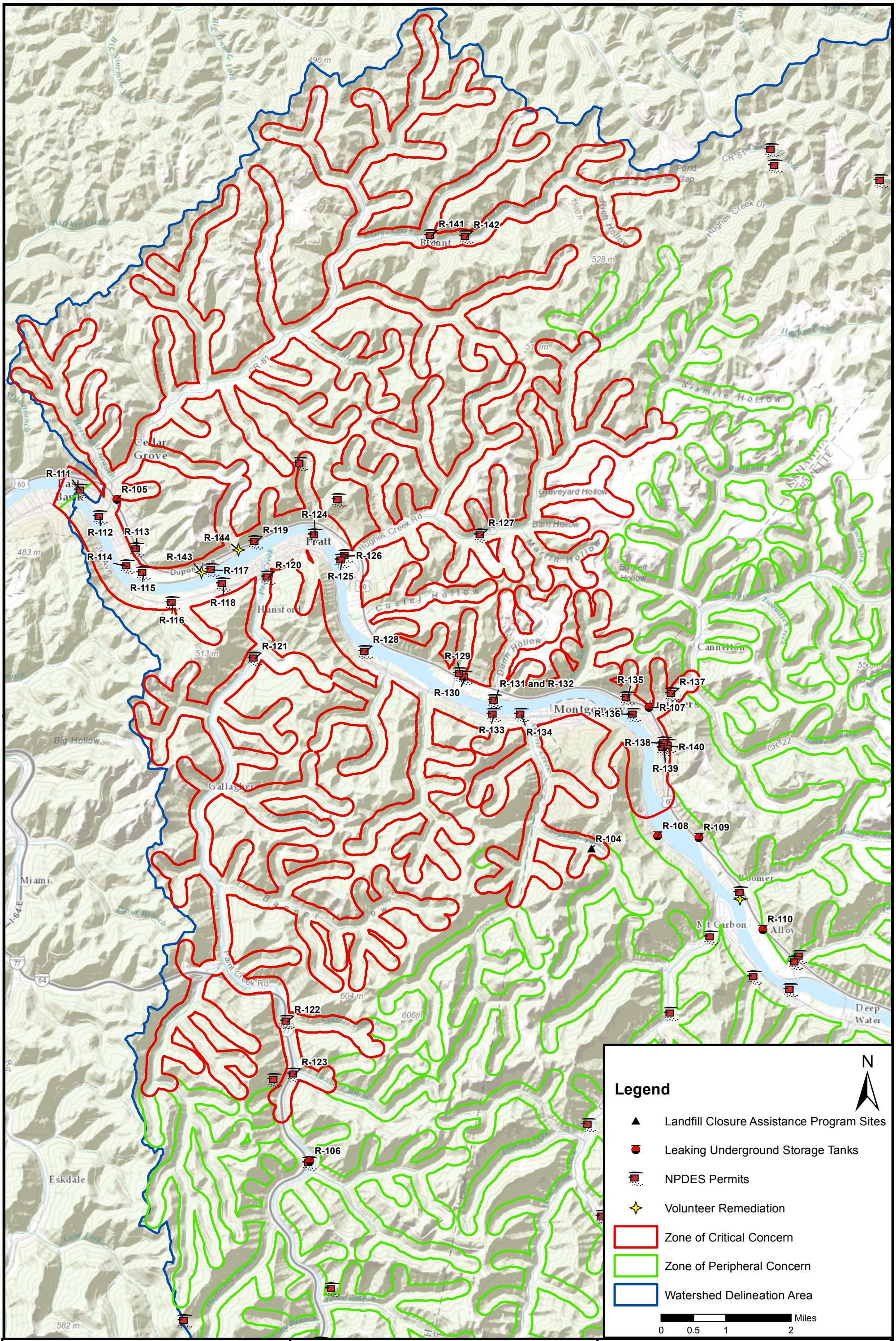
Community of Cedar Grove
PWSID: WV3302009
Source Water Protection Plan

Figure A-5. Mining Permits, Abandoned Mine Land Points, Highwalls, and Areas, Bond Forfeiture Sites, and Coal Refuse Sites

CREATED BY: CEM | DATE: 04/28/16



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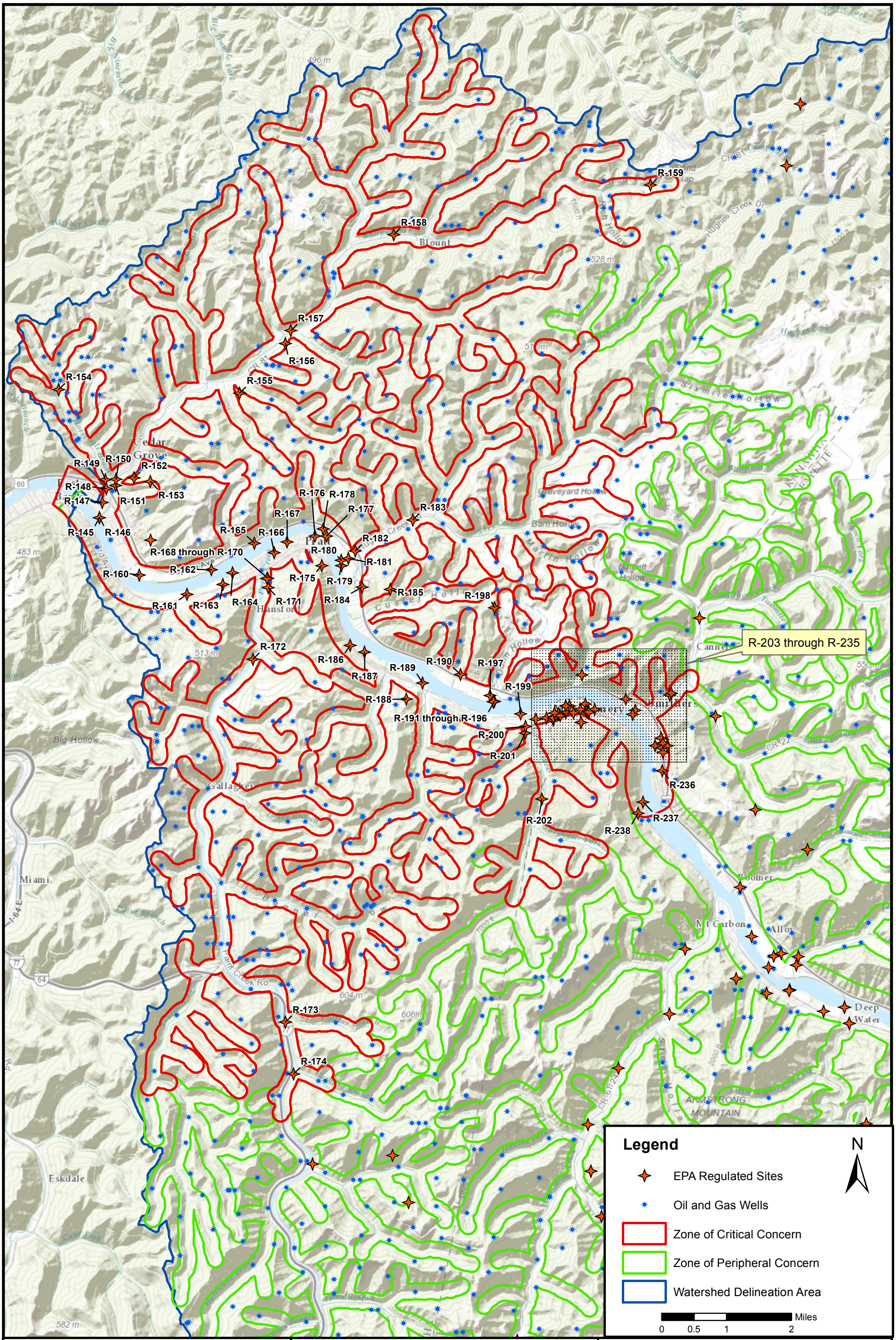
PWSID: WV3302009
Source Water Protection Plan

Figure A-6. Landfill Closure Assistance Program Sites, Leaking Underground Storage Tanks, NPDES Permits, and Volunteer Remediation

CREATED BY: CEM

DATE: 04/29/16



TETRA TECH
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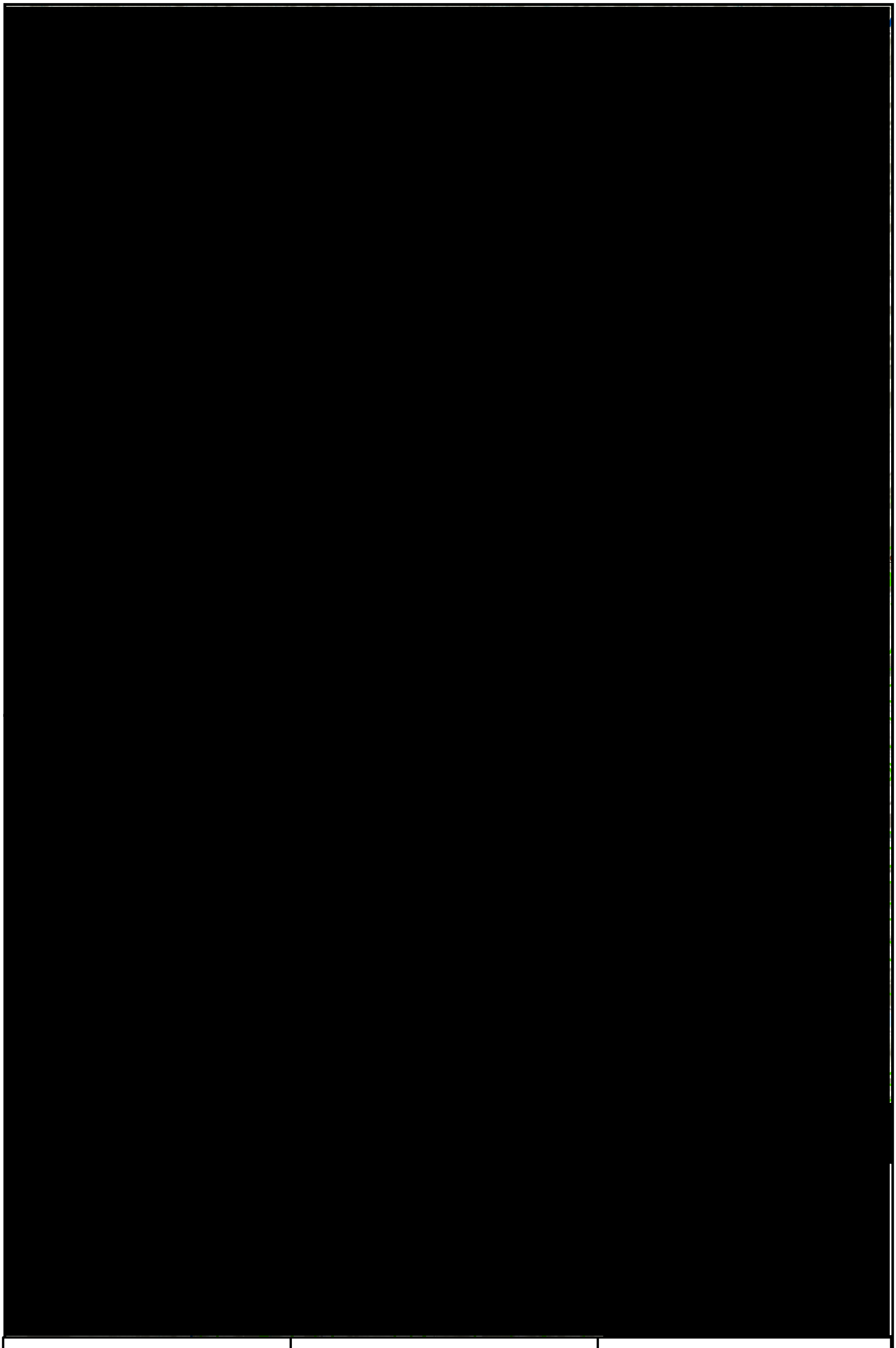
PWSID: WV3302009
Source Water Protection Plan

Figure A-7. EPA Regulated Sites and Oil/Gas Wells

CREATED BY: CEM

DATE: 05/02/16



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Source Water Protection Plan

Figure A-8. Aboveground Storage Tanks

CREATED BY: CEM

DATE: 05/02/16

List of Potential Sources of Significant Contamination

Cedar Grove PSSC Location Summary

PSSC Layer	In ZCC	Around ZCC	In ZPC	Around ZPC	In Watershed	Total Records
Mining Outlets	372	132	396	625	5381	**6906**
NPDES Permits	32	2	25	18	2820	**2897**
Bond Forfeiture Sites	7	4	10	11	300	**332**
USEPA Regulated Sites	85	9	47	23	2696	**2860**
Field Verified PSSCs	75	2	75	12	1045	**1209**
Oil/Gas Wells	262	240	315	570	2742	**4129**
Above Ground Storage Tanks	157	60	165	266	1850	**2498**
Leaking Underground Storage Tanks	2	0	5	0	138	**145**
Volunteer Remediation	2	0	1	0	26	**29**
Total	**994**	**449**	**1039**	**1525**	**16998**	**21005**

Field Verified PSSCs – Figure A-4

PSSC Number	Site Name	Site Description	Map Code	Comments
1	Railroad Tracks ROW	Railroad Tracks (right of way)	M-17	CSX Railroad
2	GLASGOW WASTEWATER TREATMENT PLANT	Wastewater Treatment Plant	M-29	GLASGOW WASTEWATER TREATMENT PLANT
3	UNNAMED GAS WELL	Wells: oil and gas	I-40	WELLS: OIL AND GAS (GAS)
4	UNNAMED GAS WELL	Wells: oil and gas	I-40	WELLS: OIL AND GAS (GAS)
5	CEDAR GROVE COMMUNITY SCHOOL	Schools	M-21	SCHOOLS - CEDAR GROVE COMMUNITY SCHOOL
6	UNNAMED GAS WELL	Wells: oil and gas	I-40	WELLS: OIL AND GAS (GAS)
7	US Route 60	Highway	M-7	highway
8	COOKE FUNERAL HOME	Funeral services and crematories	C-15	FUNERAL SERVICES AND CREMATORIES - COOKE FUNERAL HOME
9	UNNAMED STORAGE TANKS	Above Ground Storage Tanks	C-1	ABOVE GROUND STORAGE TANKS
10	UNNAMED GAS WELL	Wells: oil and gas	I-40	WELLS: OIL AND GAS (GAS)

PSSC Number	Site Name	Site Description	Map Code	Comments
11	UNNAMED GAS WELL	Wells: oil and gas	I-40	WELLS: OIL AND GAS (GAS)
12	UNITED ENERGY	Above Ground Storage Tanks	C-1	ABOVE GROUND STORAGE TANK - UNITED ENERGY
13	FIRST BIG MOUNTAIN MINING	Permitted Discharge Pipe (outfall)	I-27	OMR NPDES PERMITTED DISCHARGE (OUTFALL) - FIRST BIG MOUNTAIN MINING
14	WARD CEMETERY	Cemeteries	C-9	CEMETERIES - WARD CEMETERY
15	COLUMBIA GAS BUFFLICK FACILITY	Public Utilities (phone, gas, electric power)	I-30	PUBLIC UTILITIES (PHONE, GAS, ELECTRIC POWER)
16	UNNAMED GAS WELL	Wells: oil and gas	I-40	WELLS: OIL AND GAS (GAS)
17	APOGEE COAL CO. DBA ARCH	Other	I-44	OMR PERMIT (OTHER) - APOGEE COAL CO. DBA ARCH
18	Mammoth Coal Company	Other	I-44	coal mining company
19	STOCKTON MINE-RICH HOLLOW	Mines: abandoned	I-23	FORMER MINING
20	STOCKTON MINE-RICH HOLLOW	Lagoon/Pond/Pit	I-16	POND
21	STOCKTON MINE-RICH HOLLOW	Other	C-53	SEPTIC TANK
22	STOCKTON MINE-RICH HOLLOW	Mines: abandoned	I-23	FORMER MINING
23	STOCKTON MINE-RICH HOLLOW	Other	C-53	SEPTIC TANK
24	STOCKTON MINE-RICH HOLLOW	Utility Substation Transformers	C-49	UTILITY SUBSTATION TRANSFORMER
25	State Route 61	Highway	M-7	highway
26	AEP KANAWHA RIVER PLANT	Mining: underground	I-25	MINING UNDERGROUND - AEP KANAWHA RIVER PLANT
27	R J Recycling LLC	Other	I-44	recycling center
28	PRATT WASTEWATER TREATMENT PLANT	Wastewater Treatment Plant	M-29	WASTEWATER TREATMENT PLANT
29	FRED'S SERVICES CENTER	Auto repair shops	C-3	REPAIR SHOP
30	RUMBLE READY MIX	Cement/concrete plants	I-2	READY MIX BATCH PLANT
31	J C BAKER AND SONS	Petroleum production and storage facilities	I-28	J C BAKER AND SONS
32	HUGHSTON TERMINAL	Material stockpiles (coal, metallic ores, phosph.	I-21	HUGHSTON TERMINAL
33	UNNAMED OUTFALL	Permitted Discharge Pipe (outfall)	I-27	OMR NPDES - PERMITTED DISCHARGE PIPE (OUTFALL)
34	STOCKTON MINE #1	Hardware/lumber/parts stores	C-21	SUPPLY HOUSE
35	STOCKTON MINE #1	Above Ground Storage Tanks	C-1	AST'S
36	STOCKTON MINE #1	Lagoon/Pond/Pit	I-16	POND

PSSC Number	Site Name	Site Description	Map Code	Comments
37	STOCKTON MINE #1	Above Ground Storage Tanks	C-1	2 AST'S
38	STOCKTON MINE #1	Equipment rental/repair shop	C-13	FLAT AREA
39	STOCKTON MINE #1	Wastewater Treatment Plant	M-29	SEWAGE TREATMENT PLANT
40	STOCKTON MINE #1	Junk yards, scrap and auto	C-25	FLAT AREA
41	STOCKTON MINE #1	Railroad Tracks and Yards	C-41	RAILROAD TRACK
42	Railroad Tracks ROW	Railroad Tracks (right of way)	M-17	railroad
43	State Route 61	Highway	M-7	highway
44	UNNAMED OUTFALL	Permitted Discharge Pipe (outfall)	I-27	OMR NPDES - PERMITTED DISCHARGE PIPE (OUTFALL)
45	LONDON LOCKS & DAM	Other	I-44	LOCKS & DAM
46	AUTO REPAIR SHOP - HUTCH'S	Auto repair shops	C-3	AUTO REPAIR SHOP
47	HUTCH'S BODY SHOP WRECKER SERVICE	Junk yards, scrap and auto	C-25	JUNK YARD IN LOWER BRANCH IN PRATT
48	OMR NPDES (MINE DRAINAGE)	Permitted Discharge Pipe (outfall)	I-27	OMR NPDES (MINE DRAINAGE)
49	Railroad Tracks ROW	Railroad Tracks (right of way)	M-17	Norfolk southern Railroad
50	CSX TRANSPORTATION	Railroad Tracks and Yards	C-41	RAILROAD TRACKS\YARD
51	OMR PERMIT SURFACE MINE - CANNELTON INDUSTRIES INC.	Mining: Surface	I-24	OMR PERMIT SURFACE MINE - CANNELTON INDUSTRIES INC.
52	US Route 60	Highway	M-7	highway
53	ANDERSON & HAIRSTON FUNERAL HOME	Funeral services and crematories	C-15	FUNERAL HOME
54	WEST END LAUNDRY CENTER	Laundromats	C-27	LAUNDRY FACILITY
55	O'DELL FUNERAL HOME	Funeral services and crematories	C-15	FUNERAL HOME
56	Marisco Concrete Plant	Cement/concrete plants	I-2	cement/concrete batch palnt
57	BOAT LAUNCH; MARINA	Marina/boat docks	C-30	BOAT LAUNCH; MARINA
58	NAPA AUTO CARE	Auto repair shops	C-3	AUTO REPAIR
59	Montgomery Auto Repair	Auto repair shops	C-3	auto repair shop
60	WV TECH MAINTENANCE SHOP	Repair Shops (engine, appliances, etc.)	C-43	MAINTENANCE SHOP
61	UNNAMED GAS WELL	Wells: oil and gas	I-40	GAS WELL NEAR WV TECH
62	7 Eleven gas station	Gas Stations	C-18	

PSSC Number	Site Name	Site Description	Map Code	Comments
63	Hospital parking garage	Parking lots/malls	C-35	
64	Montgomery General Hospital	Hospitals	C-24	
65	Brown Chevrolet Oldsmobile	Car dealerships	C-7	
66	Jan-Care Ambulance service	Fleet/truck/bus terminals	C-14	old info Verizon utility
67	Boat ramp in Montgomery	Marina/boat docks	C-30	
68	PCS #4	Permitted Discharge Pipe (outfall)	I-27	PERMITTED DISCHARGE PIPE (OUTFALL) - MONTGOMERY WASTEWATER TREATMENT PLANT
69	Valley High School and Valley Elementary	Schools	M-21	
70	Smithers Waste Water Treatment Plant	Wastewater Treatment Plant	M-29	
71	Exxon gas station in Smithers	Gas Stations	C-18	
72	Lift Station	Wastewater application	M-28	
73	Car wash not named	Car washes	C-8	
74	Fox Auto Supply now closed	Repair Shops (engine, appliances, etc.)	C-43	former NARCO repair shop
75	PCS #15	Permitted Discharge Pipe (outfall)	I-27	PERMITTED DISCHARGE PIPE - MONTGOMERY WASTEWATER TREATMENT PLANT
76	Adandoned Mine portal collapsed and draining	Mining: underground	I-25	Mine portal collapsed and draining
77	Fishook Fork refuse area	Mining: Surface	I-24	

*Note: 77 of 1209 sites were prioritized and labeled in this analysis due to their potential level of threat or proximity to the intake. The remaining sites in the watershed should be considered by the water system but are not shown and labeled on the map.

Abandoned Mine Lands – Figure A-5

R-Value	Regulation Type	Pad Number	Pad Name	PROB Key
R-1	AML Points	WV004924	CEDAR GROVE (RAMSEY) LANDSLIDE	DI
R-2	AML Points	WV005522	Sugar Camp Branch Portals	HEF
R-3	AML Points	WV002220	MILL HOLLOW COMPLEX	HEF
R-4	AML Points	WV002220	MILL HOLLOW COMPLEX	DI
R-5	AML Points	WV002220	MILL HOLLOW COMPLEX	DI
R-6	AML Points	WV002220	MILL HOLLOW COMPLEX	DI
R-7	AML Points	WV002220	MILL HOLLOW COMPLEX	DI

R-Value	Regulation Type	Pad Number	Pad Name	PROB Key
R-8	AML Points	WV002220	MILL HOLLOW COMPLEX	DI
R-9	AML Points	WV002220	MILL HOLLOW COMPLEX	DI
R-10	AML Points	WV002220	MILL HOLLOW COMPLEX	DI
R-11	AML Points	WV002220	MILL HOLLOW COMPLEX	HEF
R-12	AML Points	WV006234	TUCKER OPEN PORTALS	DI
R-13	AML Points	WV004739	MAMMOTH (GARTON) LANDSLIDE	DI
R-14	AML Points	WV004198	KELLYS CREEK WATER SUPPLY	PWHC
R-15	AML Points	WV002934	MAMMOTH STRUCTURE	HEF
R-16	AML Points	WV006274	HUGHES CREEK (BURKE-QUINN) PORTALS	DI
R-17	AML Points	WV006274	HUGHES CREEK (BURKE-QUINN) PORTALS	DI
R-18	AML Points	WV006003	HUGHES CREEK (BURKE) DRAINAGE	GHE
R-19	AML Points	WV005625	BUFFLICK PORTALS	HEF
R-20	AML Points	WV005625	BUFFLICK PORTALS	HEF
R-21	AML Points	WV005625	BUFFLICK PORTALS	VO
R-22	AML Points	WV000115	HOLLY GROVE "A" LANDSLIDE	DI
R-23	AML Points	WV005888	JONES BRANCH (TONEY) DI	DI
R-24	AML Points	WV001262	JONES BRANCH REFUSE	HEF
R-25	AML Points	WV001262	JONES BRANCH REFUSE	HEF
R-26	AML Points	WV001137	FOURMILE FORK EQUIPMENT "A"	HEF
R-27	AML Points	WV001137	FOURMILE FORK EQUIPMENT "A"	HEF
R-28	AML Points	WV001137	FOURMILE FORK EQUIPMENT "A"	HEF
R-29	AML Points	WV001137	FOURMILE FORK EQUIPMENT "A"	HEF
R-30	AML Points	WV006055	HANDLEY/UPPER CREEK DRAINAGE	WA
R-31	AML Points	WV006055	HANDLEY/UPPER CREEK DRAINAGE	DI
R-32	AML Points	WV006055	HANDLEY/UPPER CREEK DRAINAGE	WA
R-33	AML Points	WV004015	MONTGOMERY (MCNABB) VO	VO
R-34	AML Points	WV004015	MONTGOMERY (MCNABB) VO	DI
R-35	AML Points	WV004015	MONTGOMERY (MCNABB) VO	DI
R-36	AML Points	WV005650	WVU TECH DRAINAGE/MORRIS CREEK WATERSHED	HEF
R-37	AML Points	WV005903	MORRIS CREEK - OPPOSUM HOLLOW	PWAI

R-Value	Regulation Type	Pad Number	Pad Name	PROB Key
R-38	AML Points	WV005904	MORRIS CREEK - LOWER MAINSTEM	PWAI
R-39	AML Points	WV005905	MORRIS CREEK - UPPER MAINSTEM	PWAI
R-40	AML Points	WV005906	MORRIS CREEK - BLACKSNAKE HOLLOW	PWAI
R-41	AML Points	WV002862	SMITHERS CREEK PORTAL	HEF
R-42	AML Points	WV006037	RT. 60 DRAINAGE	VO
R-43	AML Points	WV004551	SMITHERS (LONG) MINE DRAINAGE	DI
R-44	AML Points	WV004551	SMITHERS (LONG) MINE DRAINAGE	DI
R-45	AML Points	WV004551	SMITHERS (LONG) MINE DRAINAGE	WA
R-46	AML Points	WV004551	SMITHERS (LONG) MINE DRAINAGE	WA
R-47	AML Points	WV004551	SMITHERS (LONG) MINE DRAINAGE	WA

*Note: 47 of 866 sites were prioritized and labeled in this analysis due to their potential level of threat or proximity to the intake. The remaining sites in the watershed should be considered by the water system but are not shown and labeled on the map.

Mining Outlets – Figure A-5

R-Value	Regulation Type	Permit Number	Responsible Party	Permit Count
R-48	HPU	WV0094366	KELLEY'S CREEK & NWSTRN RR	1
R-49	HPU	WV0094323	FIRST BIG MOUNTAIN MINING CO	2
R-50	HPU	WV1025341	WVDEP OFFICE OF SPECIAL RECLAMATION	5
R-51	HPU	WV0091502	FIRST BIG MOUNTAIN MINING CO	2
R-52	HPU	WV1009168	APOGEE COAL CO DBA ARCH OF WEST VIRGINIA, INC.	4
R-53	HPU	WV1009150	CATENARY COAL COMPANY LLC	13
R-54	HPU	WV0093726	JACKS BRANCH COAL COMPANY	6
R-55	HPU	WV0051853	PRINCESS SUSAN COAL CO	1
R-56	HPU	WV0093084	APOGEE COAL CO DBA ARCH OF WEST VIRGINIA, INC.	23
R-57	HPU	WV0038989	DONALDSON MINE CO	1
R-58	HPU	WV0000213	JACKS BRANCH COAL COMPANY	5
R-59	HPU	WV0093254	JACKS BRANCH COAL COMPANY	7
R-60	HPU	WV0093173	DONALDSON MINE CO	4
R-61	HPU	WV0091138	DONALDSON MINE CO	1
R-62	HPU	WV1019635	KANAWHA ENERGY COMPANY	12

R-Value	Regulation Type	Permit Number	Responsible Party	Permit Count
R-63	HPU	WV1009869	KANAWHA ENERGY COMPANY	1
R-64	HPU	WV0093262	JACKS BRANCH COAL COMPANY	3
R-65	HPU	WV0093742	PRINCESS SUSAN COAL CO	62
R-66	HPU	WV0093581	PRINCESS SUSAN COAL CO	14
R-67	HPU	WV0052426	COYOTE COAL CO LLC	2
R-68	HPU	WV1026984	WVDEP OFFICE OF SPECIAL RECLAMATION	2
R-69	HPU	WV1019244	KANAWHA ENERGY COMPANY	13
R-70	HPU	WV1021753	KANAWHA ENERGY COMPANY	8
R-71	HPU	WV0063649	CANNELTON INDUSTRIES INC	19
R-72	HPU	WV1019350	JACKS BRANCH COAL COMPANY	1
R-73	HPU	WV1012452	JACKS BRANCH COAL COMPANY	25
R-74	HPU	WV1009265	APOGEE COAL CO DBA ARCH OF WEST VIRGINIA, INC.	5
R-75	HPU	WV0093823	NEW KING FUEL CO INC	3
R-76	HPU	WV0094081	FRASURE CREEK MINING, LLC	4
R-77	HPU	WV0055824	LAW RIVER COMPANY LLC	4
R-78	HPU	WV0099511	JACKS BRANCH COAL COMPANY	10
R-79	HPU	WV1009222	CANNELTON INDUSTRIES INC	1
R-80	HPU	WV0051829	JACKS BRANCH COAL COMPANY	6
R-81	HPU	WV0099503	CANNELTON INDUSTRIES INC	3
R-82	HPU	WV0048305	CANNELTON INDUSTRIES INC	8
R-83	HPU	WV0093929	JACKS BRANCH COAL COMPANY	64
R-84	HPU	WV0057002	MAPLE COAL CO LLC	23
R-85	HPU	WV0094340	MOUNTAIN VIEW COAL COMPANY	8
R-86	HPU	WV1015087	MOUNTAIN VIEW COAL COMPANY	5
R-87	HPU	WV1021940	TYLER MORGAN, L.L.C.	10
R-88	HPU	WV1021818	TYLER MORGAN, L.L.C.	10

*Note: 41 of 661 sites were prioritized and labeled in this analysis due to their potential level of threat or proximity to the intake. The remaining sites in the watershed should be considered by the water system but are not shown and labeled on the map.

Bond Forfeiture Sites – Figure A-5

R-Value	Regulation Type	COMPANY	PERMIT	Date Revoked
R-89	SPREC	PRINCESS SUSAN COAL CO.	S-6-85	12/7/1993
R-90	SPREC	FIRST BIG MTN. MINING CO.	U-24-85	1/5/1993
R-91	SPREC	PRINCESS SUSAN COAL CO.	S-6002-87	12/7/1993
R-92	SPREC	PRINCESS SUSAN COAL CO.	S-6033-86	12/7/1993
R-93	SPREC	PRINCESS SUSAN COAL CO.	I-481	12/7/1993
R-94	SPREC	FIRST BIG MTN. MINING CO.	U-6005-86	7/27/1992
R-95	SPREC	KEENAN TRUCKING CO., INC.	UO-608	10/21/1994
R-96	SPREC	NEW KING FUEL	U-6016-87	7/28/1993
R-96	SPREC	ALTEC ENERGY, INC	P-3010-99	10/22/2007
R-97	SPREC	CAPITOL FUELS, INC.	O-122-83	9/7/1993
R-98	SPREC	CAPITOL FUELS, INC.	U-178-83	1/12/1989

*Note: 11 of 32 sites were prioritized and labeled in this analysis due to their potential level of threat or proximity to the intake. The remaining sites in the watershed should be considered by the water system but are not shown and labeled on the map.

Coal Impoundments and Refuse Areas – Figure A-5

R-Value	Facility Name	Company	Size (acre)
R-99			4.42
R-100	BIG HOLLOW SLURRY IMPOUNDMENT	JACKS BRANCH COAL COMPANY	22.40
R-101	DONALDSON PREP PLAND & REFUSE	JACKS BRANCH COAL COMPANY	36.44
R-102	REFUSE AREA NO. 3	JACKS BRANCH COAL COMPANY	11.34
R-103	REFUSE AREA NO. 3	JACKS BRANCH COAL COMPANY	6.91
R-104			37.89
R-105	LADY DUNN CR FACILITY	JACKS BRANCH COAL COMPANY	133.50
R-106	FITZGERALD BRANCH REFUSE AREA	MOUNTAIN VIEW COAL COMPANY	16.48

*Note: 8 of 63 sites were prioritized and labeled in this analysis due to their potential level of threat or proximity to the intake. The remaining sites in the watershed should be considered by the water system but are not shown and labeled on the map. PSSCs R-107 - R-110 were relabeled and included at the end of the sequence. The LUST sites are shown on Figure A-6.

NPDES Permits – Figure A-6

R-Value	Regulation Type	Permit ID	Facility Name	Permit Type
R-111	NPDES	WVG640026	Cedar Grove Water Works	Industrial
R-112	NPDES	WV0020265	Glasgow Sewage Treatment Plant	Sewage
R-113	NPDES	WVR106946	Site of New Fire Department - Glasgow VFD	Industrial
R-114	NPDES	WV0001066	KANAWHA RIVER PLANT	Industrial
R-115	NPDES	WVR106825	138 kV / 345 kV Stations Expansion	Industrial
R-116	NPDES	WVG550100	KNOLLVIEW APARTMENTS	Sewage
R-117	NPDES	WVG610062	Riverside Yard	Industrial
R-118	NPDES	WVG610622	QUIKRETE OF WEST VIRGINIA	Industrial
R-119	NPDES	WVR106206	Hughes Creek Landslide	Industrial
R-120	NPDES	WV0021784	PRATT TOWN OF	Sewage
R-121	NPDES	WVR105336	Holly Grove Bridge, S320-83/2-0.01	Industrial
R-122	NPDES	WVR104491	Paint Creek Stream Enhancement/Restoration Project	Industrial
R-123	NPDES	WVG610697	STANDARD MAINTENANCE FACILITY	Industrial
R-124	NPDES	WVG640114	Town of Pratt Water Works	Industrial
R-125	NPDES	WVG610941	Baker Oil Company	Industrial
R-126	NPDES	WV0078182	Hugheston Terminal	Industrial
R-127	NPDES	1321-10-039	Jack's Branch Complex	Mining Underground Injection Control
R-128	NPDES	WV0078875	London Hydroelectric Plant	Industrial
R-129	NPDES	WVR106425	HUGHES CREEK LANDSLIDE 5320-60-38.87	Industrial
R-130	NPDES	WVR102148	London Waste Site, US 60	Industrial
R-131	NPDES	WV0103675	HANDLEY TOWN OF	Sewage
R-132	NPDES	WVR030007	MONTGOMERY, CITY OF	Industrial
R-133	NPDES	WV0020621	MONTGOMERY CITY OF	Sewage
R-134	NPDES	WVG611149	MARSICO BROTHERS INC	Industrial
R-135	NPDES	WVR103242	Smithers Site Development	Industrial
R-136	NPDES	WV0021741	SMITHERS CITY OF	Sewage
R-137	NPDES	WVG611083	NARCO INC	Industrial
R-138	NPDES	WVR105233	Route 60 Drainage	Industrial
R-139	NPDES	WVG072487	Wastewater System Improvements	Industrial

R-Value	Regulation Type	Permit ID	Facility Name	Permit Type
R-140	NPDES	WVG611325	Mountaineer Manufacturing, Inc.	Industrial
R-141	NPDES	WVG414689	Delores Shamblen	Sewage
R-142	NPDES	WVG414551	Melissa A Cain	Sewage

*Note: 32 of 2897 sites were prioritized and labeled in this analysis due to their potential level of threat or proximity to the intake. The remaining sites in the watershed should be considered by the water system but are not shown and labeled on the map.

Volunteer Remediation Site – Figure A-6

R-Value	Regulation Type	Project Name	Facility Name	Issue Date	Project ID
R-143	Vol_Remediation	Raleigh Junk - Riverside (VRP 03829)	Raleigh Junk - Riverside	2000/07/25	382
R-144	Vol_Remediation	Jet #48004 - Glasgow (VRP 09368)	Jet #48004 - Glasgow	2009/05/08	10727

*Note: 2 of 29 sites were prioritized and labeled in this analysis due to their potential level of threat or proximity to the intake. The remaining sites in the watershed should be considered by the water system but are not shown and labeled on the map.

USEPA Regulated Sites – Figure A-7

R-Value	Regulation Type	Primary Name	Registry ID	Registry Number
R-145	Superfund_RCRA	GLASGOW WWTP	110040000000	110039982560
R-146	Superfund_RCRA	GLASGOW TOWN OF	110011000000	110010866928
R-147	Superfund_RCRA	CEDAR GROVE COMMUNITY ELEMENTARY SCHOOL	110022000000	110022185918
R-148	Superfund_RCRA	MARK GARVEY	110046000000	110045520664
R-149	Superfund_RCRA	WRECK-A-MENDED	110008000000	110007897534
R-150	Superfund_RCRA	CEDAR TRUCKING COMPANY	110055000000	110054878511
R-151	Superfund_RCRA	BERRY TRUCKING CO INC	110055000000	110054874418
R-152	Superfund_RCRA	OFFICE OF LABORATORY SERVICES	110007000000	110006832687
R-153	Superfund_RCRA	JOE HOLLAND PARTS & SERVICE CENTER	110014000000	110014365668
R-154	Superfund_RCRA	STATEN RUN COMPRESSOR STATION	110002000000	110001931722
R-155	Superfund_RCRA	MILL HOLLOW COMPLEX	110046000000	110046139601
R-156	Superfund_RCRA	TUCKER OPEN PORTALS	110055000000	110054948508
R-157	Superfund_RCRA	WARD BRIDGE S320-81-3.57	110055000000	110055015273
R-158	Superfund_RCRA	KELLY'S CREEK AUTO REPAIR	110040000000	110039550768

R-Value	Regulation Type	Primary Name	Registry ID	Registry Number
R-159	Superfund_RCRA	BURNS LOT SITE PREPARATION	110055000000	110055011507
R-160	Superfund_RCRA	AEP KANAWHA RIVER POWER PLANT	110001000000	110000604025
R-161	Superfund_RCRA	PAINT CREEK TERMINAL	110007000000	110007346737
R-162	Superfund_RCRA	RIVERSIDE YARD	110011000000	110010875222
R-163	Superfund_RCRA	QUIKRETE OF WEST VIRGINIA	110011000000	110010871583
R-164	Superfund_RCRA	HANSFORD TREATMENT PLANT	110055000000	110054940105
R-165	Superfund_RCRA	HUGHES CREEK LANDSLIDE	110047000000	110046602707
R-166	Superfund_RCRA	PRATT ELENTARY SCHOOL	110042000000	110042343782
R-167	Superfund_RCRA	MARATHON PETROLEUM COMPANY LP	110046000000	110045567025
R-168	Superfund_RCRA	PRATT WWTP	110040000000	110039980189
R-169	Superfund_RCRA	UPPER KANAWHA VALLEY PSD	110040000000	110039982533
R-170	Superfund_RCRA	UPPER KANAWHA VALLEY PSD	110055000000	110054962359
R-171	Superfund_RCRA	PRATT TOWN OF	110011000000	110010867062
R-172	Superfund_RCRA	HOLLY GROVE BRIDGE, S320-83/2-	110046000000	110046133572
R-173	Superfund_RCRA	PAINT CREEK STREAM ENHANCEMENT	110046000000	110046140706
R-174	Superfund_RCRA	STANDARD MAINTENANCE FACILITY	110011000000	110010871299
R-175	Superfund_RCRA	PRATT PORTALS	110055000000	110054954457
R-176	Superfund_RCRA	TOWN OF PRATT WATER WORKS	110025000000	110024875009
R-177	Superfund_RCRA	RUMBLE READY MIX #2	110055000000	110055021373
R-178	Superfund_RCRA	J C BAKER & SONS	110055000000	110054950576
R-179	Superfund_RCRA	HUGHESTON TERMINAL	110011000000	110010860899
R-180	Superfund_RCRA	BAKER OIL COMPANY - BAKER OIL TERMINAL	110042000000	110042086532
R-181	Superfund_RCRA	HUGHESTON BULK PLANT	110055000000	110054933907
R-182	Superfund_RCRA	MOUNTAINEER GAS CO - HUGHESTON SERVICE CENTER	110014000000	110014366122
R-183	Superfund_RCRA	HUGHES CREEK (BURKE-QUINN) POR	110055000000	110055031255
R-184	Superfund_RCRA	LEE MOTOR SALES	110040000000	110039550786
R-185	Superfund_RCRA	JACKS BRANCH COAL COMPANY	110011000000	110010852808
R-186	Superfund_RCRA	APCO LONDON HYDRO	110040000000	110040444560
R-187	Superfund_RCRA	LONDON	110028000000	110028045979
R-188	Superfund_RCRA	HANDLEY/UPPER CREEK DRAINAGE	110055000000	110054989107

R-Value	Regulation Type	Primary Name	Registry ID	Registry Number
R-189	Superfund_RCRA	CSX TRANSPORTATION INC	110055000000	110054962652
R-190	Superfund_RCRA	HUGHES CREEK LANDSLIDE 5320-60-38.87	110055000000	110055176777
R-191	Superfund_RCRA	MONTGOMERY CITY OF	110012000000	110011899400
R-192	Superfund_RCRA	HANDLEY TOWN OF	110012000000	110011899455
R-193	Superfund_RCRA	CITY OF MONTGOMERY	110016000000	110015656761
R-194	Superfund_RCRA	MONTGOMERY WWTP	110040000000	110039982427
R-195	Superfund_RCRA	MONTGOMERY MS4	110040000000	110039982445
R-196	Superfund_RCRA	HANDLEY	110040000000	110039982515
R-197	Superfund_RCRA	JACKS BRANCH COAL COMPANY	110007000000	110007346540
R-198	Superfund_RCRA	MAMMOTH PROCESSING	110008000000	110007872711
R-199	Superfund_RCRA	MARSICO BROTHERS INC	110046000000	110046129122
R-200	Superfund_RCRA	MONTGOMERY AUTO REPAIR	110055000000	110054873286
R-201	Superfund_RCRA	CENTRAL APPALACHIAN COAL CO	110007000000	110006832142
R-202	Superfund_RCRA	MORRIS CREEK WATERSHED PROPERTY	110056000000	110055950369
R-203	Superfund_RCRA	JP'S CONTRACT & HAULING	110006000000	110005561347
R-204	Superfund_RCRA	GLOBAL CONST INC	110007000000	110006833105
R-205	Superfund_RCRA	ABC & D	110006000000	110006437249
R-206	Superfund_RCRA	BRIDGEMONT COMMUNITY & TECHNICAL COLLEGE	110008000000	110007893342
R-207	Superfund_RCRA	ENGINEERING BLDG W V TECH	110021000000	110020978352
R-208	Superfund_RCRA	7-ELEVEN #35907	110022000000	110022434622
R-209	Superfund_RCRA	MONTGOMERY AUTO	110006000000	110005566075
R-210	Superfund_RCRA	WEST VIRGINIA INST OF TECH	110008000000	110007893360
R-211	Superfund_RCRA	CAR CARE CENTER	110006000000	110005558850
R-212	Superfund_RCRA	MONTGOMERY MIDDLE SCHOOL	110016000000	110015631039
R-213	Superfund_RCRA	MONTGOMERY GENERAL HOSPITAL	110008000000	110007875905
R-214	Superfund_RCRA	FORTY OAKS MOBILE HOME PARK	110011000000	110010586400
R-215	Superfund_RCRA	WVU TECH DRNG/MORRIS CK WATERS	110055000000	110054999329
R-216	Superfund_RCRA	WVU TECH/MORRIS CK PH II	110055000000	110055013514
R-217	Superfund_RCRA	CVS PHARMACY #4432	110046000000	110045567622
R-218	Superfund_RCRA	TIRE CTRS INC	110006000000	110005558921

R-Value	Regulation Type	Primary Name	Registry ID	Registry Number
R-219	Superfund_RCRA	TURNPIKE OF MONTGOMERY	110006000000	110005555853
R-220	Superfund_RCRA	BRIDGEMONT COMMUNITY & TECHNICAL COLLEGE - DIESEL TECH. DEPT.	110046000000	110045994153
R-221	Superfund_RCRA	WVU-EHS WVU TECH	110055000000	110054873419
R-222	Superfund_RCRA	VERIZON WEST VIRGINIA INC	110006000000	110005554952
R-223	Superfund_RCRA	BROWN CHEVROLET INC	110006000000	110005552794
R-224	Superfund_RCRA	CRANBERRY PIPELINE CORPORATION	110046000000	110046461226
R-225	Superfund_RCRA	SMITHERS SITE DEVELOPMENT	110046000000	110046126312
R-226	Superfund_RCRA	VALLEY VOC TECH	110008000000	110007879420
R-227	Superfund_RCRA	SMITHERS CITY OF	110011000000	110010867035
R-228	Superfund_RCRA	NARCO INC	110008000000	110007878886
R-229	Superfund_RCRA	NARCO INC	110016000000	110015794755
R-230	Superfund_RCRA	LITTLE GENERAL STORE #3045	110033000000	110033161557
R-231	Superfund_RCRA	STEVES BODY SHOP	110006000000	110005548862
R-232	Superfund_RCRA	ROUTE 60 DRAINAGE	110046000000	110046131315
R-233	Superfund_RCRA	MOUNTAINEER MANUFACTURING, INC	110031000000	110031112221
R-234	Superfund_RCRA	WASTEWATER SYSTEM IMPROVEMENTS	110046000000	110046128383
R-235	Superfund_RCRA	MOUNTAINEER MFG	110055000000	110054874846
R-236	Superfund_RCRA	KROGER STORE #669	110033000000	110032962220
R-237	Superfund_RCRA	MAPLE COAL CO.	110011000000	110010863191
R-238	Superfund_RCRA	MAPLE COAL COMPANY	110010000000	110010411036

*Note: 95 of 2860 sites were prioritized and labeled in this analysis due to their potential level of threat or proximity to the intake. The remaining sites in the watershed should be considered by the water system but are not shown and labeled on the map.

Aboveground Storage Tanks – Figure A-8

R-Value	Regulation Type	Tank Label	Responsible Party	Capacity	Year
R-239	AST_Unique	020-00000713	MAXUM PETROLUEM PRODUCTS, INC.	[redacted]	2009
R-240	AST_Unique	020-00002563	CEDAR TRUCKING COMPANY INC	[redacted]	2000
R-241	AST_Unique	999-00001695	CEDAR TRUCKING COMPANY INC	[redacted]	2000
R-242	AST_Unique	999-00001696	CEDAR TRUCKING COMPANY INC	[redacted]	2000
R-243	AST_Unique	020-00000100	CABOT OIL & GAS CORPORATION	[redacted]	2005

R-Value	Regulation Type	Tank Label	Responsible Party	Capacity	Year
R-244	AST_Unique	020-00000304	CABOT OIL & GAS CORPORATION	[redacted]	2006
R-245	AST_Unique	020-00001773	ENERGY CORPORATION OF AMERICA	[redacted]	1987
R-246	AST_Unique	020-00001774	ENERGY CORPORATION OF AMERICA	[redacted]	1987
R-247	AST_Unique	020-00000120	COLUMBIA GAS TRANSMISSION CORP	[redacted]	2013
R-248	AST_Unique	020-00001521	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2005
R-249	AST_Unique	020-00001510	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2005
R-250	AST_Unique	020-00001511	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2005
R-251	AST_Unique	020-00001519	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2005
R-252	AST_Unique	020-00001520	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2005
R-253	AST_Unique	020-00001518	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2005
R-254	AST_Unique	020-00001517	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2005
R-255	AST_Unique	020-00000507	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2011
R-256	AST_Unique	020-00000508	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2011
R-257	AST_Unique	020-00000509	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	1998
R-258	AST_Unique	020-00000510	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	1998
R-259	AST_Unique	020-00000511	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2011
R-260	AST_Unique	020-00000512	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2011
R-261	AST_Unique	020-00001515	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2009
R-262	AST_Unique	020-00001516	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2009
R-263	AST_Unique	020-00001572	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	1998
R-264	AST_Unique	020-00001570	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	1998
R-265	AST_Unique	020-00001571	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	1998
R-266	AST_Unique	020-00001541	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	1998
R-267	AST_Unique	020-00000506	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2006
R-268	AST_Unique	020-00001523	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2006
R-269	AST_Unique	020-00001542	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	1998
R-270	AST_Unique	020-00001522	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2006
R-271	AST_Unique	020-00001524	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2006
R-272	AST_Unique	020-00001150	KANAWHA ENERGY COMPANY	[redacted]	2004
R-273	AST_Unique	020-00001152	KANAWHA ENERGY COMPANY	[redacted]	2004

R-Value	Regulation Type	Tank Label	Responsible Party	Capacity	Year
R-274	AST_Unique	020-00002857	KANAWHA ENERGY COMPANY	[redacted]	2004
R-275	AST_Unique	020-00001153	KANAWHA ENERGY COMPANY	[redacted]	2004
R-276	AST_Unique	020-00001151	KANAWHA ENERGY COMPANY	[redacted]	2004
R-277	AST_Unique	020-00001789	ENERGY CORPORATION OF AMERICA	[redacted]	1985
R-278	AST_Unique	020-00001790	ENERGY CORPORATION OF AMERICA	[redacted]	1985
R-279	AST_Unique	020-00001788	ENERGY CORPORATION OF AMERICA	[redacted]	1985
R-280	AST_Unique	020-00000574	D. C. MALCOLM, INC.	[redacted]	1970
R-281	AST_Unique	999-00000955	ROGERS PETROLEUM SERVICES INC	[redacted]	1986
R-282	AST_Unique	999-00000959	ROGERS PETROLEUM SERVICES INC	[redacted]	1984
R-283	AST_Unique	999-00000960	ROGERS PETROLEUM SERVICES INC	[redacted]	1984
R-284	AST_Unique	020-00001762	ENERGY CORPORATION OF AMERICA	[redacted]	1987
R-285	AST_Unique	020-00001540	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	1998
R-286	AST_Unique	020-00001525	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2006
R-287	AST_Unique	020-00001512	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2005
R-288	AST_Unique	020-00001539	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	1998
R-289	AST_Unique	020-00001513	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2005
R-290	AST_Unique	020-00001538	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	1998
R-291	AST_Unique	020-00001514	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2005
R-292	AST_Unique	020-00001508	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2005
R-293	AST_Unique	020-00001551	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	1998
R-294	AST_Unique	020-00001491	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2004
R-295	AST_Unique	020-00002117	CABOT OIL & GAS CORPORATION	[redacted]	2006
R-296	AST_Unique	020-00002107	CABOT OIL & GAS CORPORATION	[redacted]	2006
R-297	AST_Unique	020-00001534	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2006
R-298	AST_Unique	020-00001533	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2007
R-299	AST_Unique	020-00001526	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2006
R-300	AST_Unique	020-00002310	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2006
R-301	AST_Unique	020-00001573	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2011
R-302	AST_Unique	020-00001535	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2006
R-303	AST_Unique	020-00001536	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2006

R-Value	Regulation Type	Tank Label	Responsible Party	Capacity	Year
R-304	AST_Unique	020-00002114	CABOT OIL & GAS CORPORATION	[redacted]	2001
R-305	AST_Unique	020-00002113	CABOT OIL & GAS CORPORATION	[redacted]	2001
R-306	AST_Unique	020-00002109	CABOT OIL & GAS CORPORATION	[redacted]	2005
R-307	AST_Unique	020-00002112	CABOT OIL & GAS CORPORATION	[redacted]	2002
R-308	AST_Unique	020-00002842	KANAWHA ENERGY COMPANY	[redacted]	2004
R-309	AST_Unique	999-00001508	JONES OIL COMPANY, INC.	[redacted]	2009
R-310	AST_Unique	020-00001935	CABOT OIL & GAS CORPORATION	[redacted]	1992
R-311	AST_Unique	020-00001509	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2006
R-312	AST_Unique	999-00001484	JONES OIL COMPANY, INC.	[redacted]	2003
R-313	AST_Unique	020-00000660	CABOT OIL & GAS CORPORATION	[redacted]	2014
R-314	AST_Unique	020-00002116	CABOT OIL & GAS CORPORATION	[redacted]	2001
R-315	AST_Unique	020-00001154	KANAWHA ENERGY COMPANY	[redacted]	2004
R-316	AST_Unique	020-00002872	KANAWHA ENERGY COMPANY	[redacted]	2004
R-317	AST_Unique	020-00002851	KANAWHA ENERGY COMPANY	[redacted]	2004
R-318	AST_Unique	020-00002854	KANAWHA ENERGY COMPANY	[redacted]	2004
R-319	AST_Unique	020-00002855	KANAWHA ENERGY COMPANY	[redacted]	2004
R-320	AST_Unique	020-00002861	KANAWHA ENERGY COMPANY	[redacted]	2004
R-321	AST_Unique	020-00002859	KANAWHA ENERGY COMPANY	[redacted]	2004
R-322	AST_Unique	020-00002860	KANAWHA ENERGY COMPANY	[redacted]	2004
R-323	AST_Unique	020-00002868	KANAWHA ENERGY COMPANY	[redacted]	2004
R-324	AST_Unique	020-00001183	CABOT OIL & GAS CORPORATION	[redacted]	1938
R-325	AST_Unique	020-00002852	KANAWHA ENERGY COMPANY	[redacted]	2004
R-326	AST_Unique	020-00002871	KANAWHA ENERGY COMPANY	[redacted]	2004
R-327	AST_Unique	020-00002865	KANAWHA ENERGY COMPANY	[redacted]	2004
R-328	AST_Unique	020-00002840	KANAWHA ENERGY COMPANY	[redacted]	2004
R-329	AST_Unique	020-00002841	KANAWHA ENERGY COMPANY	[redacted]	2004
R-330	AST_Unique	020-00002853	KANAWHA ENERGY COMPANY	[redacted]	2004
R-331	AST_Unique	020-00002864	KANAWHA ENERGY COMPANY	[redacted]	2004
R-332	AST_Unique	020-00002866	KANAWHA ENERGY COMPANY	[redacted]	2004
R-333	AST_Unique	020-00002845	KANAWHA ENERGY COMPANY	[redacted]	2004

R-Value	Regulation Type	Tank Label	Responsible Party	Capacity	Year
R-334	AST_Unique	020-00002856	KANAWHA ENERGY COMPANY	[redacted]	2004
R-335	AST_Unique	999-00000964	ROGERS PETROLEUM SERVICES INC	[redacted]	2001
R-336	AST_Unique	999-00000966	ROGERS PETROLEUM SERVICES INC	[redacted]	2004
R-337	AST_Unique	020-00002847	KANAWHA ENERGY COMPANY	[redacted]	2004
R-338	AST_Unique	999-00000965	ROGERS PETROLEUM SERVICES INC	[redacted]	2004
R-339	AST_Unique	020-00002873	KANAWHA ENERGY COMPANY	[redacted]	2004
R-340	AST_Unique	020-00002846	KANAWHA ENERGY COMPANY	[redacted]	2004
R-341	AST_Unique	020-00002867	KANAWHA ENERGY COMPANY	[redacted]	2004
R-342	AST_Unique	020-00002844	KANAWHA ENERGY COMPANY	[redacted]	2004
R-343	AST_Unique	020-00002849	KANAWHA ENERGY COMPANY	[redacted]	2004
R-344	AST_Unique	999-00000962	ROGERS PETROLEUM SERVICES INC	[redacted]	1986
R-345	AST_Unique	999-00000963	ROGERS PETROLEUM SERVICES INC	[redacted]	1988
R-346	AST_Unique	999-00000961	ROGERS PETROLEUM SERVICES INC	[redacted]	1986
R-347	AST_Unique	999-00000968	ROGERS PETROLEUM SERVICES INC	[redacted]	2006
R-348	AST_Unique	999-00000969	ROGERS PETROLEUM SERVICES INC	[redacted]	2005
R-349	AST_Unique	999-00000967	ROGERS PETROLEUM SERVICES INC	[redacted]	2005
R-350	AST_Unique	999-00000954	ROGERS PETROLEUM SERVICES INC	[redacted]	1985
R-351	AST_Unique	999-00000958	ROGERS PETROLEUM SERVICES INC	[redacted]	1983
R-352	AST_Unique	999-00000957	ROGERS PETROLEUM SERVICES INC	[redacted]	1998
R-353	AST_Unique	020-00002862	KANAWHA ENERGY COMPANY	[redacted]	2004
R-354	AST_Unique	020-00001617	MAXUM PETROLUEM PRODUCTS, INC.	[redacted]	2010
R-355	AST_Unique	999-00000213	B & M OIL CO	[redacted]	1995
R-356	AST_Unique	999-00000211	B & M OIL CO	[redacted]	1995
R-357	AST_Unique	999-00000212	B & M OIL CO	[redacted]	1995
R-358	AST_Unique	020-00002848	KANAWHA ENERGY COMPANY	[redacted]	2004
R-359	AST_Unique	020-00002850	KANAWHA ENERGY COMPANY	[redacted]	2004
R-360	AST_Unique	020-00002115	CABOT OIL & GAS CORPORATION	[redacted]	2001
R-361	AST_Unique	020-00001485	MAXUM PETROLUEM PRODUCTS, INC.	[redacted]	2011
R-362	AST_Unique	020-00001489	MAXUM PETROLUEM PRODUCTS, INC.	[redacted]	2012
R-363	AST_Unique	020-00001484	MAXUM PETROLUEM PRODUCTS, INC.	[redacted]	2011

R-Value	Regulation Type	Tank Label	Responsible Party	Capacity	Year
R-364	AST_Unique	020-00001482	MAXUM PETROLUEM PRODUCTS, INC.	[redacted]	2011
R-365	AST_Unique	020-00001483	MAXUM PETROLUEM PRODUCTS, INC.	[redacted]	2011
R-366	AST_Unique	999-00000234	B & M OIL CO	[redacted]	2000
R-367	AST_Unique	020-00002467	MARSICO BROTHERS, INC.	[redacted]	2008
R-368	AST_Unique	010-00000109	WV AMERICAN WATER CO	[redacted]	1994
R-369	AST_Unique	020-00000309	CABOT OIL & GAS CORPORATION	[redacted]	1990
R-370	AST_Unique	020-00000305	CABOT OIL & GAS CORPORATION	[redacted]	2010
R-371	AST_Unique	020-00000308	CABOT OIL & GAS CORPORATION	[redacted]	1985
R-372	AST_Unique	020-00000306	CABOT OIL & GAS CORPORATION	[redacted]	2010
R-373	AST_Unique	010-00000549	CABOT OIL & GAS CORPORATION	[redacted]	1972
R-374	AST_Unique	010-00000044	NORTH AMERICAN REBUILD CO DBA NARCO INC	[redacted]	1996
R-375	AST_Unique	010-00000045	NORTH AMERICAN REBUILD CO DBA NARCO INC	[redacted]	1990
R-376	AST_Unique	010-00000046	NORTH AMERICAN REBUILD CO DBA NARCO INC	[redacted]	1992
R-377	AST_Unique	010-00000178	WVDEP OFFICE OF ENVIRONMENTAL REMEDIATION	[redacted]	1998
R-378	AST_Unique	020-00000636	EQT GATHERING LLC	[redacted]	2010
R-379	AST_Unique	020-00002104	WV PARKWAYS ECO DEV & TOURISM	[redacted]	2013
R-380	AST_Unique	020-00002105	WV PARKWAYS ECO DEV & TOURISM	[redacted]	2005
R-381	AST_Unique	020-00001674	MAXUM PETROLUEM PRODUCTS, INC.	[redacted]	2011
R-382	AST_Unique	020-00001675	MAXUM PETROLUEM PRODUCTS, INC.	[redacted]	2011
R-383	AST_Unique	020-00001712	MAXUM PETROLUEM PRODUCTS, INC.	[redacted]	2011
R-384	AST_Unique	999-00001030	MEADOWS OIL CO INC	[redacted]	1998
R-385	AST_Unique	999-00001031	MEADOWS OIL CO INC	[redacted]	1995
R-386	AST_Unique	020-00001768	ENERGY CORPORATION OF AMERICA	[redacted]	1978
R-387	AST_Unique	020-00001490	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2002
R-388	AST_Unique	020-00001562	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	1998
R-389	AST_Unique	020-00001769	ENERGY CORPORATION OF AMERICA	[redacted]	1985
R-390	AST_Unique	020-00001770	ENERGY CORPORATION OF AMERICA	[redacted]	1985
R-391	AST_Unique	020-00001589	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	2005
R-392	AST_Unique	020-00001592	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	1998
R-393	AST_Unique	020-00001593	CHESAPEAKE APPALACHIA, L.L.C.	[redacted]	1998

R-Value	Regulation Type	Tank Label	Responsible Party	Capacity	Year
R-394	AST_Unique	020-00001739	MAXUM PETROLUEM PRODUCTS, INC.	[redacted]	2007

*Note: 156 of 2501 sites were prioritized and labeled in this analysis due to their potential level of threat or proximity to the intake. The remaining sites in the watershed should be considered by the water system but are not shown and labeled on the map.

Leaking Underground Storage Tanks – Figure A-6

R-Value	Regulation Type	WVID	Facility Name	Cleanup Complete
R-105 R-395	LUST	2009281	CEDAR GROVE EXXON	02/26/2008
R-106 R-396	LUST	2002617	MORTON SERVICE AREA	-
R-107 R-397	LUST	1000915	PIT ROW # 202	12/06/1991
R-108 R-398	LUST	1000889	EAGLE MART LLC	-
R-109 R-399	LUST	1000967	HAREWOOD COMPLEX	12/23/2009
R-110 R-400	LUST	1000944	GO MART STORE #028	-

*Note: 6 of 145 sites were prioritized and labeled in this analysis due to their potential level of threat or proximity to the intake. The remaining sites in the watershed should be considered by the water system but are not shown and labeled on the map.

Capped Landfill Sites – Figure A-6

R-Value	Regulation Type	Name	Permittee	Permit Number	Acres Capped
R-401	LCAP_Sites	Montgomery Landfill	City of Montgomery	SWC-7047/WV0109207	8.27

*Note: 1 of 3 sites were prioritized and labeled in this analysis due to their potential level of threat or proximity to the intake. The remaining sites in the watershed should be considered by the water system but are not shown and labeled on the map.

APPENDIX B. EARLY WARNING MONITORING SYSTEM FORM

Form B - Proposed Early Warning Monitoring Systems

Cedar Grove Water Department

Primary Surface Water Source:

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. These plans are proposed systems that would work for Cedar Grove using current technology and the current plant and intake configuration.

The primary source of raw water for Cedar Grove is the Kanawha River. The intake is located just downstream of the mouth of Kellys Creek near the town of East Bank.

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 any West Virginia stream or 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 Kanawha 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 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. The Storm 3 would need to be housed in a sampling shed of some kind on the riverbank. This structure needs to be sturdy and out of the flood plain if possible. 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 need to be housed in a small sampling shed. A small diameter line would run out from this structure 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.

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 back to the plant 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 organics and other specific parameters that may indicate a contamination event. 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?

The UV-VIS Full Monitoring System would need to be located close to the intake, which might mean a small structure would need to be built on the river bank to house the equipment. A small-diameter line or hose would run from this structure 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 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 because the intake is located near an existing neighborhood, supplying it with electricity shouldn't be a problem.

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 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

Town of Cedar Grove Water Department

PWSID: WV3302009

Administrative Contact: James Hudnall

Contact Phone Number: 304-595-4198

Plan Developed: July 2016

ACKNOWLEDGMENTS:

This plan was developed by the Town of Cedar Grove 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.

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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
Kenneth Barton	Cedar Grove Municipal Water	304-595-2991	-	Primary Spokesperson
James Hudnall	Mayor- Community of Cedar Grove	[redacted]	-	Secondary Spokesperson
Robert Burdette	Cedar Grove Municipal Water	304-595-2991	-	Member
Michael D. Coleman	Cedar Grove Volunteer Fire Department	[redacted]	-	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 (see example press releases)
- 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:

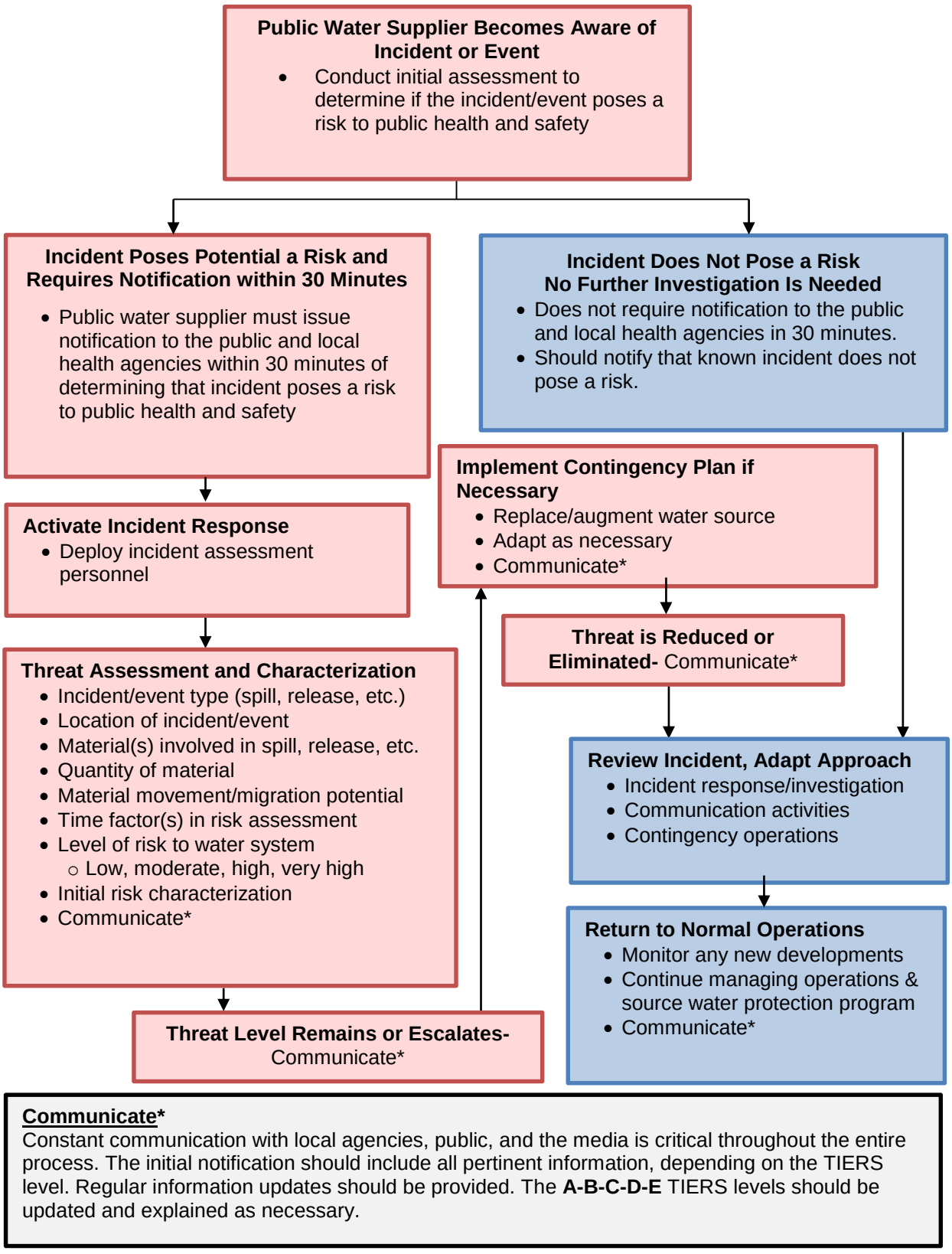
- Verification of the incident/event type (spill, release, etc.)
- Location of incident/event
- Type of material(s) involved in spill, release, etc.
- Quantity of material involved
- Potential of the material to move, migrate, or be transported
- Relevant time factor(s) in the risk assessment (e.g., 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, see attached example press releases)
  - 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

If time permits and the need arises, after the threat level is reduced, the water system staff, the communication and source water protection teams, and their partners may 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:	Kenneth Barton	304-595-2991	-
Alternate spokesperson:	Robert Budette	304-595-2991	-
Designated location to disseminate information to media:	Cedar Grove Town Hall		
Methods of contacting affected residents:	Cedar Grove Municipal Water contacts residents about important information using word of mouth, door to door canvasing, radio, and local television.		

	Name	Title	Phone Number	Email
Media contacts:	WVNSTV	59 News CBS Affiliate, Oak Hill, WV	304-929-6420	news@wvnstv.com
	WSAZ	News Channel 3 NBC Affiliate, Charleston, WV	304-344-3521	news@wsaz.com
	WOAYTV 50	ABC Affiliate, Oak Hill, WV	304-469-3361	news@woay.com

Emergency Services Contacts

	Name	Emergency Phone	Alternate Phone	Email
Local Police	Cedar Grove Police Department	911	304-595-1841	-
	Kanawha County Sheriff	911	304-357-0169	-
Local Fire Department	Cedar Grove Volunteer Fire Department	911	304-595-2244	-
Local Ambulance Service	Cedar Grove Ambulance	911	304-595-2244	-
	Kanawha County Ambulance Authority	911	304-345-2312	-

Hazardous Material Response Service	Cedar Grove Volunteer Fire Department	911	304-595-2244	-

Key Personnel

	Name	Title	Phone	Email
Key staff responsible for coordinating emergency response procedures?	James Hudnall	Mayor	[redacted]	-
	Kenneth Barton	Chief Operator	304-595-2991	-
Staff responsible for keeping confidential PSSC information and releasing to emergency responders:	James Hudnall	Mayor	[redacted]	-
	Kenneth Barton	Chief Operator	304-595-2991	-

Sensitive Populations

Other communities that are served by the utility:	Glasgow, East Bank, Mill Branch, Buff Lick		
Major user/sensitive population notification:	**Name**	**Emergency Phone**	**Alternate Phone**
	Upper Kanawha Medical Center	304-595-1770	-
	Golden Living Center	304-595-1155	-
	Cedar Grove Middle School	304-949-1642	-
	East Bank Middle School	304-595-2311	-
EED District Office Contact:	**Name**	**Phone**	**Email**
	John Stafford/Chris Farrish	Beckley District Office 304-256-6666 Central Office 304-558-2981	john.pb.stafford@wv.gov 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**
	N/A	N/A	N/A	N/A

Are you planning on implementing the TIER system?	Yes

Emergency Response Information

List laboratories available to perform sample analysis in case of emergency:	**Name**	**Phone**
	REI Consultants	304-255-2500
	WV Office of Lab Services	304-558-3530
	ALS Environmental- South Charleston, WV	304-356-3168

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?	Unknown

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/

APPENDIX D. SINGLE SOURCE FEASIBILITY STUDY

ENGINEERING STUDY FOR CONTINGENCY PLANNING

Town of Cedar Grove Water Department
PWSID No. WV3302009

Prepared for:

Town of Cedar Grove Water Department
PO Box 536
Cedar Grove, West Virginia 25039

Prepared by:

Potesta & Associates, Inc.
7012 MacCorkle Avenue, SE
Charleston, West Virginia 25304
Phone: (304) 342-1400 Fax: (304) 343-9031
Email: potesta@potesta.com

Project No. 0101-15-0023-040

August 24, 2015

(This document contains 20 pages, plus appendices.)

POTESTA

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Oxidation Reduction Potential ..... ORP
Potesta & Associates, Inc. ..... POTESTA
Preliminary Engineering Report ..... PER
Public Service District ..... PSD
Regional Intergovernmental Council ..... RIC
Safe Drinking Water Act ..... SDWA
Source Water Assessment and Protection ..... SWAP
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State Historic Preservation Office ..... SHPO
Ultraviolet Absorbance Sensor ..... UVAS
United States Army Corp of Engineers ..... USACE
United States Fish and Wildlife Service ..... USFWS
United States Geologic Survey ..... USGS
Water Treatment Plant ..... WTP
West Virginia American Water ..... WVAW
West Virginia Department of Environmental Protection ..... WVDEP
West Virginia Department of Health and Human Resources ..... WVDHHR
West Virginia Division of Highways ..... WVDOH
West Virginia Geologic and Economic Survey ..... WVGES
West Virginia Infrastructure & Jobs Development Council ..... IJDC
West Virginia Public Lands Corporation ..... PLC
West Virginia Public Service Commission ..... PSC

ENGINEERING STUDY FOR CONTINGENCY PLANNING

Town of Cedar Grove Water Department
PWSID No. WV3302009

1.0 INTRODUCTION

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. 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 SDWA required states to develop and implement a Source Water Assessment and Protection (SWAP) program designed to evaluate the vulnerability of public drinking water systems to possible sources of contamination, and encourages states to work with these systems in developing protection and management plans. In 1999, the West Virginia Department of Health and Human Resources (WVDHHR) published the West Virginia Source Water Assessment and Protection Program, which was endorsed by the United States Environmental Protection Agency. Although the Town of Cedar Grove Water Department treats its 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. The purpose of a Source Water Protection Plan (SWPP) is to describe what the source water provider (SWP) has done, is currently doing, and plans to do to protect its source of drinking water. The Town of Cedar Grove Water Department completed an SWPP on March 25, 2010.

On January 9, 2014, approximately 7,500 gallons of 4-methylcyclohexanemethanol (MCHM) leaked out of an aboveground storage tank, owned by Freedom Industries, Inc., which was situated on the east bank of the Elk River. The liquid MCHM entered the Elk River approximately 1.5 miles upstream of West Virginia American Water's (WVAW) source water intake for over 300,000 people in the Charleston, West Virginia area. The potable water supply was adversely impacted. In response to the Freedom Industries, Inc. leak, Senate Bill 373 (containing the Public Water Supply Protection Act §22-31) was approved by the 2014 Legislature and signed into law by Governor Earl Ray Tomblin on April 1, 2014. The law officially took effect on June 6, 2014. The Bureau for Public Health (BPH) submitted rule revisions for Legislative Rule 64 Code of State Rule (CSR) 3 Public Water Systems to the Secretary of State's office with respect to source water protection planning enacted in Senate Bill 373. The Public Water Supply Protection Act and Legislative Rule 64CSR3 requires SWPs, such as the Town of Cedar Grove Water Department, to update their SWPP. This update requires an engineering study which details a technical and economic examination of alternative source water options in the event the provider's source water is contaminated (i.e., single source analysis) in addition to other water system information.

The West Virginia Legislature appointed monies to the BPH, a division of WVDHHR, to financially assist SWPs with updates required in Senate Bill 373. The BPH in turn transferred a portion of the monies to the various regional planning and development councils, including the Regional Intergovernmental Council (RIC) in South Charleston, West Virginia, to procure and manage engineering firms providing engineering services associated with updating SWPPs. Potesta & Associates, Inc. (POTESTA) was selected by RIC to prepare this Engineering Study for Contingency Planning for the Updated Source Water Assessment and Protection Plan Report. This will assist the Town of Cedar Grove Water Department with the required engineering portions of the SWPP update. The SWPP update is due to the Commissioner of the Bureau for Public Health on or before July 1, 2016 as stated in §64-3 (14.3, 14.6.b-g).

2.0 GENERAL METHODOLOGY

The object of the report was to evaluate and determine alternative source water options to supply the Town of Cedar Grove Water Department in the event of spill or contamination of the primary source water supply. Additionally, the report examines other water system information required by the updated SWPP report due to the Commissioner of the Bureau for Public Health by July 1, 2016. Included in the effort was:

1. Met with the Town of Cedar Grove Water Department staff in order to garner knowledge of the Town of Cedar Grove Water Department's water supply system.

2. Reviewed water utility annual reports; BPH sanitary surveys; monthly operational reports (MORs); "West Virginia Department of Environmental Protection (WVDEP) GIS Resources for 7Q10 Flow Estimates, May 18, 2015"; West Virginia Geologic & Economic Survey's online coal mapping tool; "West Virginia Mine Pool Atlas," submitted by West Virginia Geologic and Economic Survey (WVGES), May 2012; and "Aquifer-Characteristics Data for West Virginia," U.S. Geologic Survey (USGS) Water-Resources Report 01-4036, 2001.

3. Reviewed Appendix E-Feasibility Study Guidance Document and the associated feasibility matrix provided by WVDHHR.

4. Completed identification and feasibility matrix evaluation of alternative source water options.

5. Performed a more detailed study of highest scoring alternative source water option(s) identified by the feasibility matrix, including preparing more detailed rationalization of certain alternative source water options and their estimates of cost.

6. Compiled and/or summarized other Town of Cedar Grove Water Department water system information:

a. SWP's ability to isolate or divert contaminated waters from its water supply, and identification of the amount of raw water storage capacity.

b. SWP's ability to switch to an alternative water source or surface water intake in the event of contamination.

c. SWP's capability to close its water supply in the event the primary water source is contaminated and identification of the duration of time it can keep the water supply closed without creating a public health emergency.

d. SWP's examination of existing available storage capacity and how its existing available storage capacity compares to the Town of Cedar Grove Water Department's normal daily usage including total treated water storage, raw water storage and the number of hours of supply capacity.

e. An examination of technical and economic feasibility of implementing an early warning monitoring system.

f. An analysis of the Town of Cedar Grove Water Department's ability to operate effectively during power outages including means to supply water through treatment, storage and distribution without creating a public emergency. This step included reviewing the BPH's Emergency Generator Data table that was provided to POTESTA.

g. An estimation of the calculated level of unaccounted for water, and if the calculated water is greater than 15 percent, identification of measures the SWP is actively taking to reduce the level of water loss.

h. The Town of Cedar Grove Water Department's ability to meet future water supply needs by expanding a current source or developing a new one, including a description of current plan and pumping capacity and projections for growth over the next five years that would exceed the current system capacity.

7. Prepared this report in draft format and forwarded it to the Town of Cedar Grove Water Department for review and comment.

8. Met with the Town of Cedar Grove Water Department as a follow-up to the draft submittal of the report to receive comments on the draft report.

9. Revised and finalized this report after receiving comments from the Town of Cedar Grove Water Department.

10. Presented this report at a September 2015 town council meeting.

3.0 TOWN OF CEDAR GROVE WATER DEPARTMENT SYSTEM SUMMARY

The Town of Cedar Grove Water Department operates a community public water system. The system serves the Town of Cedar Grove, but also sells water to two other public water systems: Glasgow and East Bank. Neither of those systems are a source water provider. The Town of Cedar Grove system can be summarized as follows:

Town of Cedar Grove Water Department System Characteristics	Values
Raw Water Intake on the Kanawha River Adjacent to the WTP	N/A
Customers (including East Bank and Glasgow)	1225
Treatment Capacity	1,440,000 GPD (1000 GPM)
Average Daily Production (MOR 2014)	791,263 GPD (549 GPM)
Maximum Daily Production (MOR 2014)	1,033,000 GPD (717 GPM)
Raw Water Storage Capacity	0 Gallons*
Treated Water Storage Capacity	750,000 Gallons**

* *Ignoring small storage available in raw water pump station(s) or presedimentation tank(s).*

** *Town of Cedar Grove Water Department treated water storage includes purchasing systems' East Bank and Glasgow tankage.*

4.0 SINGLE SOURCE ANALYSIS

The Town of Cedar Grove Water Department is supplied by a single source. Therefore, POTESTA performed an evaluation to determine technically and economically feasible option(s) for the Town of Cedar Grove Water Department. The evaluation process included using the feasibility matrix provided by the WVDHHR. The feasibility matrix allowed POTESTA to evaluate several options at a "high level" using multiple criteria identified by WVDHHR. The options included:

1. Construct or establish a secondary or backup surface water intake (herein called Option A1) or wells (Option A2) which would draw water from a substantially different location or water source.

2. Construct additional raw water storage capacity (Option B1) or treated water storage capacity (Option B2) to provide at least two days of additional system storage based on the plant's maximum level of production experienced within the last year and following Public Water Systems Design Standards §64-77-9.1.a, §64-77-9.4.

3. Create or construct operational interconnection(s) with another SWP to allow the SWP to receive its water from a different source of supply or supply (herein called Option C).

4. Create or construct other alternative(s) (referred to as Option D) available to the SWP to secure safe and reliable alternative supplies during a period its primary source of supply is unavailable or negatively impacted for an extended period.

If the Town of Cedar Grove Water Department already had multiple sources, then the Town of Cedar Grove Water Department was also required to evaluate the SWP's ability to meet the utility's demands independently for 30, 60, 90 or more days. However, the Town of Cedar Grove Water Department obtains its water from a single source and, therefore, POTESTA did not complete this evaluation.

If one or more of the options were determined to be technologically or economically feasible, POTESTA then performed a detailed study analysis on the comparative costs, risks and benefits of implementing alternative source water options as described in Section 4.3.

4.1 Descriptions of Alternative Source Water Options

The following summarizes the evaluated alternative source water options in more detail:

4.1.1 Backup Intake (Option A1)

POTESTA considered various streams in the Town of Cedar Grove Water Department WTP area to assess whether they were a feasible alternative source water option for a backup intake. Kellys Creek was identified as a potential stream for a backup intake due to its obvious size and associated higher flow and its proximity to the WTP. POTESTA reviewed the 7Q10 (lowest average discharge over a period of one week with a recurrence interval of 10 years) and found that the Kellys Creek Regional Flow for summer 7Q10 of 0.258 cubic feet per second (166,749 gallons per day) is less than the Town of Cedar Grove Water Department's average production flow rate in 2014 of 791,263 gallons per day.

Based on this factor, utilization of a backup intake was deemed not desirable and hence not feasible, and therefore, Option A1 was scored "zero" when entered into the feasibility matrix.

4.1.2 Wells (Option A2)

In order to evaluate the technical and economic feasibility of a ground water well field as an alternative source water option for the Town of Cedar Grove Water Department, POTESTA referred to *"The Aquifer-Characteristics Data for West Virginia," Water-Resources Investigations Report 01-4036,* which was prepared to assist BPH delineate well-head (source water) protection areas for public-supply wells and well fields in West Virginia in 2001. Report 01-4036's Appendix details specific capacity and transmissivity data segregated by aquifer for selected wells in West Virginia. POTESTA used specific well data from Report 01-4036's Appendix to estimate well yields within close proximity to the Town of Cedar Grove Water Department's water treatment plant (see table below).

Site Identification Number	Longitude	Latitude	County	Hydrogeologic Unit (Aquifer)	Well Depth (ft)	Discharge (gpm)	Draw Down (ft)	Specific Capacity (gpm/ft)	Transmissivity (ft^2/d)
381102081284901	38° 11′ 02″	81° 28′ 49″	Kanawha	Kanawha Formation	220	225	2	113	31,000
381415081330001	38° 14′ 15″	81° 33′ 00″	Kanawha	New River Formation	600	180	109	1.65	440 (estimated)
381417081325101	38° 14′ 17″	81° 32′ 51″	Kanawha	Pottsville Group	440	350	64	5.47	1,300
380847081173901	38° 08′ 47″	81° 17′ 39″	Fayette	Kanawha Formation	92	2	14	0.14	37

The four well values indicate a typical discharge of 189 gallons per minute per well. We have used this value to estimate what a typical well yield would be near the Town of Cedar Grove's Water Department. The Town of Cedar Grove Water Department's maximum production day in 2014 was 717 GPM. This would indicate a need for approximately four wells in order to supply the Town of Cedar Grove Water Department with 717 GPM. However, the nearest well to the WTP with a site identification number 380847081173901, has a discharge of 2 gallons per minute. This low discharge rate indicates more than four wells would likely be required to supply the Town of Cedar Grove with the required 717 GPM. Such a well field would have a high capital cost, along with being complex to operate given the limited automatic controls of the WTP, would almost certainly locate wells in existing commercial / residential areas, and would require ongoing costs to maintain adequate well yields. In fact, nearby wells are in industrial areas and potential exists for groundwater contamination. Additionally, the chemistry of ground water commonly varies significantly from nearby surface water, possibly resulting in undesirable conditions (taste, color, odor, etc.) unless additional treatment was added. Based on these factors, utilization of wells (i.e., a well field) was deemed not desirable and hence not feasible. Since POTESTA arrived at this conclusion when evaluating wells for all engineering studies for the RIC SWP's, Option A2 was not entered into the project feasibility matrix for any SWP.

4.1.3 Raw Water Storage (Option B1)

The Town of Cedar Grove Water Department does not currently have any significant raw water storage capacity. Two days supply of water storage estimated from the WTP's maximum level of production in one day (2014) is approximately 2,066,000 gallons. The Town of Cedar Grove Water Department's current treated water storage capacity is 750,000 gallons (see Section 4.1.4). Therefore, the Town of Cedar Grove Water Department needs an additional 1,316,000 gallons of water storage to have two days system storage at the WTP's maximum production level in 2014. POTESTA considered increasing raw water storage capacity by adding a raw water reservoir and adding raw water storage tanks. A raw water reservoir was not considered due to the steep surrounding hillsides, "urban" setting of the WTP, and ongoing maintenance required of a reservoir. Accordingly, raw water tankage was selected as an input for the feasibility matrix. The "rule of thumb" cost for two 700,000-gallon raw water tanks (rounded up from 1,316,000 gallons) was input into the feasibility matrix and includes costs for the tanks and roofs (further study might eliminate the need for such a roof), foundation work, mobilization, property acquisition, demolition, electrical, and other factors. These storage tanks would be located within close proximity to the WTP. Due to limited space near the WTP, it is believed that land acquisition including demolition of existing structures would be necessary.

POTESTA has developed a preliminary opinion of total estimated project (i.e., capital) cost for this option, which is presented in **Appendix B**.

4.1.4 Treated Water Storage (Option B2)

Town of Cedar Grove Water Department Treated Water Storage Tanks	Gallons
Cedar Grove Tank	100,000

Town of Cedar Grove Water Department Treated Water Storage Tanks	Gallons
Cedar Grove Tank	200,000
Town of East Bank Tank	150,000
Town of Glasgow Tank	200,000
Town of Glasgow Tank	100,000
Total Treated Water Storage:	***750,000***

Senate Bill 373 sets forth that the submitted plan shall include an examination and analysis of the technical and economic feasibility of 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 experienced within the past year as an alternative source water option. The Town of Cedar Grove Water Department is deficient 1,316,000 gallons of treated water based on two days of maximum production in 2014, as noted in Section 4.1.3. Dunn Engineers, Inc. provided the Town of Cedar Grove Water Department with a Preliminary Engineering Report (PER) titled, "Water Distribution System Improvements," revised March 2015. This proposed project proposes extensive line replacement, and includes the construction of a 300,000-gallon tank for treated water storage.

POTESTA evaluated additional raw water tankage rather than water tanks storing treated water because adding 1,316,000 gallons of treated water tankage may not allow adequate turnover of the treated water as set forth in §64-77-9.4. A lack of adequate turnover can create water quality issues with treated water in the distribution system. Similarly, Appendix E-Feasibility Study Guidance Documents provided by WVDHHR notes that studies examining the alternative of additional raw and/or treated water must comply with existing design standards regulating treated water storage, including minimum storage capacity and adequate turn-over requirements (§64-77-9.1.a, §64-77-9.4). More importantly, POTESTA believes that relying solely on treated water storage is not prudent as much of the storage may not be available when required. The storage may not be available at certain times of the day due to diurnal demand patterns, and due to the fact that water main failures, leaks, etc. can rapidly deplete water storage volumes.

Based on this design standards constraint, adding 1,316,000 gallons of treated water was deemed not feasible and, therefore, Option B2 was scored "zero" when entered into the feasibility matrix.

4.1.5 Interconnection with WVAW (Option C)

Creating an interconnection with WVAW was entered into the feasibility matrix due to WVAW's existing water line near the intersection of US Route 60 and Kellys Creek Road, which is in close proximity to the Town of Cedar Grove Water Department's existing water system. POTESTA used the Town of Cedar Grove Water Department's maximum production day in 2014 of 1,033,000 GPD (717 GPM) to perform a preliminary hydraulic calculation which indicated an 8-inch water line from WVAW's system is required to sustain the daily flow. The interconnection would consist of approximately 150 feet of 8-inch water line to connect WVAW's system to the Town of Cedar Grove Water Department's water system. POTESTA considered the water line components, a meter vault, and a pressure reducing valve, as the Town

of Cedar Grove Water Department is on a lower pressure gradient (based on the elevation of their treated water storage tanks, which are near the interconnection point). POTESTA has developed a preliminary opinion of total estimated project (i.e., capital) cost for this option, which is presented in **Appendix B**.

It should be noted that as of the time of this report, WVAW has not been officially approached or agreed to provide the amount of water described above. An agreement would have to be developed with WVAW and approved by the WVPSC, and possibly WVDHHR. Such an agreement is outside the scope of this study.

4.1.6 Other Alternative Source Water Option: Abandoned Mine Pool Withdrawal (Option D)

The Town of Cedar Grove Water Department's water treatment plant is located within close proximity to several abandoned deep mines. POTESTA used the WVGES's website to identify options for accessing abandoned mines for source water. The interactive coal bed mapping application from WVGES indicates deep (i.e., underground) mines located in the Cedar Grove Coal Seam within close proximity to the WTP and in the No. 2 Gas Coal Seam approximately 3 miles from the WTP. Additionally, POTESTA referred to the West Virginia Mine Pool Atlas Report, a two-year study (submitted to the WVDEP and WVGES) which evaluated abandoned coal mines as a potential groundwater source. The deep mines located in the Cedar Grove Coal Seam are not mentioned in the West Virginia Mine Pool Atlas Report which considered coal beds containing underground mines that were greater than 500 acres and located below or near drainage. It should also be noted that extending a pipeline between the water treatment plant and the deep mines in the Cedar Grove Coal Seam would be costly and disruptive, as the lines would have to extend through town and under a major roadway (United State Route 60). Therefore, the Cedar Grove mines were not investigated further as potential alternative source water option. However, POTESTA did evaluate another deep mine. Lady Dunn No. 105 Mine is located in the No. 2 Gas Coal Seam and identified in the West Virginia Mine Pool Atlas Report as a potentially/partially flooded underground mine that was greater than 500 acres in area. The West Virginia Mine Pool Atlas Report estimated the potential storage as 3,675,000,000 gallons. The permittee of the Lady Dunn No. 105 Mine is Alpha Natural Resources, Inc.

The Mine Pool Atlas Report indicates the water volume in the Lady Dunn No. 105 Mine could serve the Town of Cedar Grove Water Department as an alternative source water option; however, the over 3-mile distance to the WTP makes the probable total project costs prohibitive for a pipe line and associated pumping equipment. An Abandoned Mine Pool Withdrawal was deemed not feasible and, therefore, Option D was scored "zero" when entered into the feasibility matrix.

4.2 Feasibility Matrix Result Summary

POTESTA used the feasibility matrix to rank alternative source water options that "passed" the first evaluation described in Section 4.1. The feasibility matrix addresses economic, technical and environmental criterion, as noted in the feasibility matrix in **Appendix A**. Table 4.2 presents

a summary of the alternative source water options in the feasibility matrix (also included are the options that did not "pass" the initial evaluation). Table 4.2 presents the option ranking per the feasibility matrix score, the preliminary opinion of total estimated project (i.e., capital) cost and advantages and disadvantages. Option C – Interconnection with WVAW ranked the highest.

It should be noted that total budget year cost to operate and maintain the Town of Cedar Grove Water Department is a required data input field in the feasibility matrix. POTESTA used the total operation and maintenance expenses located on Page 603D of the Town of Cedar Grove Water Department's Annual Report for Year Ended 2014 to fill the data field. "Rule of thumb" cost estimates were used to fill additional input fields in the feasibility matrix. In some cases, POTESTA developed estimates of costs for other SWP systems being studied by POTESTA, and interpolated or extrapolated those costs to alternative source water options being studied at the Town of Cedar Grove Water Department.

Table 4.2: Summary of Alternative Source Water Options, Including Feasibility Matrix Results

Alternative Source Water Option	Option Ranking per Feasibility Matrix Score In Appendix A	Summary of Major Construction*	Preliminary Opinion of Total Estimated Project (i.e., Capital) Cost	Advantages	Disadvantages
Backup Intake (Option A1)	N/A	N/A	N/A	N/A	N/A
Well (Option A2)	N/A	N/A	N/A	N/A	N/A
Raw Water Storage (Option B1)	2	♦ Tanks ♦ Foundations ♦ Valving/Piping ♦ Site Work ♦ Property Demolition ♦ Water Line ♦ Fence, Gate, Pavement Restoration	$2,600,000	♦ Raw water readily available.	♦ Permitting difficulty. ♦ In a commercial and residential area. ♦ Negative aesthetic impacts. ♦ Potential odor issues.
Treated Water Storage (Option B2)	N/A	N/A	N/A	N/A	N/A
Interconnection (Option C)	1	♦ 150 Feet, 8-inch Water Line ♦ Meter Vault/Pressure Reducing Valve ♦ Connection to Existing Water Line	$85,000	♦ Low capital costs. ♦ Ease of permitting.	♦ WVAW may not commit to having all required raw water readily available.
Abandoned Mine Pool Withdrawal (Option D)	N/A	N/A	N/A	N/A	N/A

* *Quantities approximate.*

4.3 Detailed Study Analysis

The highest rated alternative source water option was Option C, an Interconnection with WVAW. The Town of Cedar Grove Water Department could "piggyback" this project onto the currently proposed Water Distribution System Improvements project. In addition, the Town of Cedar Grove Water Department could review undertaking this project as "self-help," resulting in substantial reductions in cost. The lower estimated capital cost for this option will likely result in significantly less impacts to customer rates.

A primary concern is that WVAW, as of the date of this report, has not agreed to provide the amount of raw water described in this report. An agreement would have to be developed with WVAW.

5.0 OTHER WATER SYSTEM INFORMATION REQUIRED FOR UPDATED SOURCE WATER ASSESSMENT PROTECTION PLAN REPORT

5.1 Ability to Isolate or Divert Contaminated Waters

The Town of Cedar Grove Water Department obtains its source water from an intake on the north shore of the Kanawha River. The Town of Cedar Grove Water Department does not employ diversion booms to isolate or divert contaminated waters from its supply. The intake pipe is stationary and is situated on the bottom of the river. A couple of pipes are affixed across the intake opening to serve as a rudimentary "screen" preventing large debris from entering the intake pipe. Since the intake is stationary, the WTP operators do not have the ability to draw water from different elevations. The Town of Cedar Grove Water Department does not have any significant raw water storage capacity (for purposes of this evaluation, POTESTA ignored raw water that may be in the treatment process).

5.2 Ability to Switch to Alternative Water Source or Surface Water Intake

The Town of Cedar Grove Water Department does not have a second water source or second surface water intake available to switch to in the event of contamination of its primary source water.

5.3 Ability to Close Water Supply, Duration of Closure, and Examination of Existing Storage Capacity

The Town of Cedar Grove Water Department has the ability to close its intake when the operators receive notification of contamination on the Kanawha River. Treated water storage fluctuates over time due to demand, water loss, production, leaks and other factors. To estimate the duration of time the Cedar Grove Water Department can keep its intake closed before the system loses water, POTESTA reviewed two data points for treated water storage: Full capacity and 50 percent capacity. The Town of Cedar Grove Water Department does not have any significant raw water storage capacity; therefore, for this evaluation, we assumed their supply

capacity is based on their treated water storage. If system demand was at the Town of Cedar Grove Water Department's average 2014 production rate and their treated water storage was full, they could keep their intake closed for approximately 23 hours. If their treated water storage was half full (50 percent capacity) and the Town of Cedar Grove Water Department's demand was at their 2014 average production rate, portions of their system would start to lose water in approximately 11 hours. A summary of this evaluation is presented in the table below.

Town of Cedar Grove Water Department	Values	Hours of Supply
Treated Water Capacity (full capacity)	750,000 gallons	23
Treated Water Capacity (50% capacity)	375,000 gallons	11
Raw Water Storage Capacity	0 gallons	0
Average Production (2014)	549 GPM	N/A

Notes: Capacity values described above include tankage in the East Bank and Glasgow systems.

Hours of supply would reduce substantially if the Town of Cedar Grove Water Department had to close their intake during demand equal to their maximum production day in 2014. It should also be noted that our estimate of hours of supply, as presented above, assumes that the Town of Cedar Grove Water Department and/or the East Bank and Glasgow systems can "match" volumes of water in any given tank with their demands. Typically, these are not equal (i.e., tank volumes will deplete at different rates), so it is possible that certain customers could lose water quicker than the hours of supply described above. A historical instance occurred when the Town of Cedar Grove Water Department closed their intake for just under 24 hours due to notification of contamination on the Kanawha River. This intake closure did not cause portions of the water system to go dry.

5.4 Early Warning Monitoring System Implementation

Early warning monitoring systems are used by SWPs to continuously monitor incoming source water. These systems allow WTP operators to anticipate changes to the treatment process required to react to storms, algal blooms, industrial discharge, chemical spills, reservoir stratification/de-stratification, construction activity, sewage spills and certain other natural or manmade occurrences. The Town of Cedar Grove Water Department does not have an early warning monitoring system. POTESTA obtained a price quote from HACH Company for an early warning monitoring system with various options. The quote is presented in **Appendix C**. In essence, installation of the early warning system represents a tradeoff between cost and capabilities. The more capabilities (e.g., the number of probes) a system contains, the higher the cost to implement the system. POTESTA reviewed the quote and identified the probe options for the recommended features. These recommended features are presented in the following table.

Line Item (per Quote in Appendix C)	Part Number	Feature Description	Price
1	580800	Back panel/trough/level (required): This item is a secure casing used to house the probes. WTP staff can go to the trough and check on all of the probes.	$ 4,500
2 4	LXV400.99.1A082 LXV402.99.00002	Module, probe (6 sensor), SC1000 Db Module, display w/o GSM, SC1000: These two line items consist of the sc1000 probe module that can accept six sensors, and the universal controller display module. An operator can just plug in the monitor and it is ready to use without special software configuration. These items include alarms and memory backup.	$ 1,344 $ 2,770
3	YAB018	Card, internal sc1000, 4mA inputs: This item includes additional analog communication capabilities for the controller.	$ 908
5	9020000	ASSY, PROBE, LDO Model 2, HACH: Probe for dissolved oxygen.	$ 1,804
6	DRD1R5-WDMP	Oxidation Reduction Potential (ORP) Sensor, Ryton, WDMP Mounting: Probe for ORP.	$ 904
7	DPD1R1-WDMP	pH Sensor, Ryton, WDMP Mounting: Probe for pH.	$ 840
8	LXV423.99.10000	SOLITAX t-line sc/immersion probe 0.001-4000 NTU; wiper; PVC: Probe for turbidity.	$ 3,474
9	LXV418.99.50002	Db Ultraviolet Absorbance Sensor (UVAS) sc PROBE, 5 mm; Probe for UVAS.	$ 17,305
14	WRTUPGSOLITAX	Instrument startup and two onsite calibrations per year.	$ 941
		Total Cost:	***$ 34,790***
		SAY:	***$ 35,000***

Note: Costs presented above include installation by Hach Company. However, they would not include all installation costs, such as extension of conduit from raw water source to the laboratory, and "soft" costs required to specify and bid the equipment.

SWPs may purchase probes in stages as funds become available. The five probes listed in the table above can monitor a broad range of changes in source water. Sudden changes in dissolved oxygen can indicate toxic conditions that effect algal respiration or increased levels of bacteria using up the oxygen. An ORP sensor may indicate sudden changes for oxidative or reducing species introduced into the water. The acid/base relationships within source water can be monitored by a pH sensor. Turbidity is a measure of suspended solids, which may indicate spills of solids, chemical compounds or increased bacterial levels. An UVAS probe is used to watch for sudden changes in organic load that would require alternative treatment procedures. As the Town of Cedar Grove Water Department increases their early warning monitoring capabilities, an additional probe to monitor oil in water could be purchased through HACH for approximately $17,500.

5.5 Ability to Operate During a Power Outage

Generators are commonly used by SWPs to provide power in the event of a power outage. POTESTA reviewed the Emergency Generator Data provided by WVDHHR and information provided by the Town of Cedar Grove Water Department staff. POTESTA then prepared the summary table below.

Water System	Power Requirements	Generator
Water Treatment Plant ♦ Raw Water Pumps ♦ High Service Pumps	(2) 20 Hp Flygt (2) 60 Hp Vertical Turbine Pumps (one duty pump, one on standby)	None

The Town of Cedar Grove Water Department does not have a generator to run the WTP during power outages. As noted in the table above, there are two raw water pumps and two high service pumps at the WTP. The high service pumps operate with one duty pump and one pump on standby. Finished water is supplied to the storage tanks by the WTP's high service pumps and then gravity fed to the distribution system.

WVDHHR performed a preliminary study to determine the size of generator required to power the WTP and is presented in **Appendix D**. Other system information is included in this study.

The Town of Cedar Grove WTP is located less than a mile from the Kanawha River Plant, a coal fired power station owned and operated by American Electric Power (AEP) near Glasgow, West Virginia. The Town of Cedar Grove Water Department believes that, historically, this close proximity to a power hub has decreased the duration of power outages for the Town of Cedar Grove's Water Department. For example, during the derecho, which occurred on June 29, 2012, the WTP was out of power for approximately 12 hours. Similarly, a mudslide occurred in April 2015 which disrupted power to the WTP for approximately an hour. However, AEP closed the Kanawha River Plant in May 2015 which could potentially lengthen power outage durations in the future for the Town of Cedar Grove Water Department. This will likely increase the need for the Town of Cedar Grove Water Department to install a generator at the WTP.

5.6 Unaccounted for Water

The Town of Cedar Grove Water Department reports unaccounted for water loss at 57.29 percent on their Water Utility Annual Report 2014. The Town of Cedar Grove Water Department hired Dunn Engineers, Inc. to prepare a Preliminary Engineering Report (PER) titled, "Water Distribution System Improvements," revised March 2015. This PER outlines the Town of Cedar Grove's intent to replace water mains, valves, service lines, water meters, fire hydrants and refurbish its two existing storage tanks in an effort to reduce water losses occurring in the water distribution system which was installed over 70 years ago. The Dunn Engineering, Inc. PER (Part VII Project Summaries, Section 4: Operation and Maintenance Costs), "estimates replacing the oldest portions of the distribution system should reduce the amount of unaccounted for water from the current 57 percent to approximately 30 percent, which will reduce the hours of operation from 20 hours to approximately 12 hours."

The Town of Cedar Grove Water Department has a basic leak identification system whereby they contact rural water yearly to check the system for leaks using audio equipment.

5.7 Ability to Meet Future Water Supply

There is no significant anticipated population growth expected in the Towns of Cedar Grove, East Bank and Glasgow as coal jobs in the area are declining.

6.0 CONCLUSIONS AND RECOMMENDATIONS

POTESTA offers the following conclusions and recommendations:

1. Creating a properly sized interconnection with WVAW would be a low cost alternative source water option for the Town of Cedar Grove Water Department.

2. If the Town of Cedar Grove Water Department elects to pursue this option, WVAW should be contacted to determine an emergency service contract and a more detailed study should be completed to estimate costs and rate impacts to customers.

3. POTESTA recommends procuring a properly sized generator to run the WTP or obtaining a service agreement with a rental company in order to prepare for future power outages which could become more common since the retirement of AEP's Kanawha River Plant.

4. The Town of Cedar Grove Water Department has no raw water storage and is deficient by design standards for treated water storage. The average daily production in 2014 for the WTP was 791,263 gallons. Two days of storage calculated from the 2014 average daily production is 1,582,526 gallons. Treated water storage for the Towns of Cedar Grove, East Bank and Glasgow total 750,000 gallons. If it is assumed that a currently

contemplated 300,000-gallon treated water storage tank is added to the water system, the Town of Cedar Grove will still be 532,526 gallons of treated storage water deficient based on two days average demand.

5. Pursuit of the water distribution improvements project envisioned by the (last revised March 2015) Dunn Engineers, Inc. PER would be beneficial to source water protection as proposed reductions in unaccounted for water will result in longer rates of hours of supply if potable water production at the WTP is interrupted.

6. The Town of Cedar Grove Water Department should develop and implement a more active leak detection program, as this will also be beneficial to source water protection for the same reason the water system improvements project will be.

7. The Town of Cedar Grove Water Department should consider purchasing an early warning monitoring system with the five probes outlined in Section 5.4.

7.0 CLOSING

This report has been prepared to aid the Town of Cedar Grove Water Department with engineering portions of the SWPP update due July 1, 2016 as stated in §64-3 (14.3, 14.6.b-g). Its scope is limited to the specific project and location described herein and represents our understanding of factors as presented in this report. If these factors change as additional data concerning this study is obtained, we should be informed so that we may examine the data and, if necessary, modify or revise the conclusions and recommendations presented in this report.

APPENDIX A

Feasibility Matrix | **Town of Cedar Grove Water Department** | **PWSID: WV3302009** | **August 24, 2015** | **Matrix Completed By:** | **Potesta & Associates, Inc.**

Criteria	Question	Backup Intake	Feasibility	Interconnection	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility	Other-Abandoned Mine Pool Withdrawal	Feasibility
Economic Criteria											
What is the total current budget year cost to operate and maintain the PWSU (current budget year)?		N/A		$218,080		N/A		$218,080		NA	
Operation and Maintenance (O&M) Costs	Describe the major O&M cost requirements for the alternative	N/A	0	Stand by costs, minimum monthly bill from SWP, pipeline maintenance, line flushing, laboratory analysis	2	N/A	0	Mixing, laboratory analysis, tank inspection and cleaning.	2	NA	0
	What is the incremental cost to operate and maintain the alternative?	N/A	0	$6,744	2	N/A	0	$5,000	2	NA	0
	Cost comparison of the incremental O&M cost to the current budgeted costs (%)	N/A	0	3.09%	2	N/A	0	2.29%	2	NA	0
O&M-Feasibility Score			***0.0***		***2.0***		***0.0***		***2.0***		***0.0***
Describe the capital improvements required to implement the alternative.		N/A		Upgrade and extend WVAW water lines and install meter. Annualized capital cost approximated (i.e., rounded value) using assumed 3.0% for 30 years		N/A		Build two 700,000 gallon storage tanks near WTP. Annualized capital cost approximated (i.e., rounded value) using assumed 3.0% for 30 years		NA	
Capital Costs	What is the total capital cost for the alternative?	N/A	0	$85,000	2	N/A	0	$2,600,000	1	NA	0
	What is the annualized capital cost to implement the alternative, including land and easement costs, convenience tap fees, etc.?	N/A	0	$4,000	2	N/A	0	$133,000	1	NA	0
	Cost comparison of the alternatives annualized capital cost to the current budgeted costs (%)	N/A	0	1.83%	2	N/A	0	34.59%	1	NA	0
Capital Cost-Feasibility Score			***0.0***		***2.0***		***0.0***		***1.0***		***0.0***
Technical Criteria											
Permitting	Provide a listing of the expected permits required and the permitting agencies involved in their approval	N/A	0	DHHR, SHPO, USFWS, PSC, UDC, WVDEP, WVDOH	3	N/A	0	DHHR, SHPO, PLC, UDC, PSC	1	NA	0
	What is the timeframe for permit approval for each permit?	N/A	0	365 Days Cumulative	3	N/A	0	365 Days Cumulative	1	NA	0
	Describe the major requirements in obtaining the permits (environmental impact studies, public hearings, etc.)	N/A	0	Prepare and submit clearance letters and permit applications. Assumes separate certificate of necessity from PSC not required. Public hearings possible, depending on PSC and funding source.	3	N/A	0	Prepare and submit clearance letters and permit applications, and certificate of convenience. Public hearings possible, depending on PSC and funding source.	1	NA	0
	What is the likelihood of successfully obtaining the permits?	N/A	0	High	3	N/A	0	Low	1	NA	0
	Does the implementation of the alternative require regulatory exceptions or variances?	N/A	0	No	3	N/A	0	No	2	NA	0
Permitting-Feasibility Score			***0.0***		***3.0***		***0.0***		***1.2***		***0.0***
Flexibility	Will the alternative be needed on a regular basis or only used intermittently?	N/A	0	Intermittently, although transition to permanent use likely	1	N/A	0	Intermittently	1	NA	0
	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?)	N/A	0	Believed minimal, although some increased likelihood of disinfection byproducts	1	N/A	0	Unclear, but could have adverse impacts including increasing likelihood of disinfection byproducts.	1	NA	0
Flexibility-Feasibility Score			***0.0***		***1.0***		***0.0***		***1.0***		***0.0***

Criteria	Question	Backup Intake	Feasibility	Interconnection	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility	Other-Abandoned Mine Pool Withdrawal	Feasibility
Resilience	Will the alternative provide any advantages or disadvantages to meeting seasonal changes in demand?	N/A	0	No	2	N/A	0	No	2	NA	0
	How resistant will the alternative be to extreme weather conditions such as drought and flooding?	N/A	0	Availability of supply from WVAW could be impacted by weather or other factors	1	N/A	0	Less resistant in cold weather, as risk of freezing in cold weather	2	NA	0
	Will the alternative be expandable to meet the growing needs of the service area?	N/A	0	Yes	2	N/A	0	No	2	NA	0
Resilience-Feasibility Score			***0.0***		***1.7***		***0.0***		***2.0***		***0.0***
Institutional Requirements	Identify any agreements or other legal instruments with governmental entities, private institutions, or other PWSU required to implement the alternative	N/A	0	WVAW agreement necessary	1	N/A	0	None	2	NA	0
	Are any development/planning restrictions in place that can act as a barrier to the implementation of the alternative?	N/A	0	No	2	N/A	0	Yes, limited space in commercial and residential area	1	NA	0
	Identify potential land acquisitions and easements requirements.	N/A	0	Land acquisition and easments required	2	N/A	0	Land acquisition would be required and could be difficult.	1	NA	0
Institutional Requirements-Feasibility Score			***0.0***		***1.7***		***0.0***		***1.3***		***0.0***
Environmental Criteria											
Environmental Impacts	Identify any environmentally protected areas or habitats that might be impacted by the alternative	N/A	0	None identified	2	N/A	0	None identified	2	NA	0
Environmental Impacts-Feasibility Score			***0.0***		***2.0***		***0.0***		***2.0***		***0.0***
Aesthetic Impacts	Identify any visual or noise issues caused by the alternative that may affect local land uses	N/A	0	None	2	N/A	0	Negative Aesthetic. Two 700,000 gallon storage tanks required in "urban" portion of Cedar Grove	1	NA	0
	Identify any mitigation measures that will be required to address aesthetic impacts	N/A	0	None	2	N/A	0	None	2	NA	0
Aesthetic Impacts-Feasibility Score			***0.0***		***2.0***		***0.0***		***1.5***		***0.0***
Stakeholdar Issues	Identify the potential stakeholders affected by the alternative	N/A	0	Customers, SWP, WVAW	1	N/A	0	Customers	1	NA	0
	Identify the potential issues with stakeholders for and against the alternative	N/A	0	May be resistance connecting to WVAW, potential rate impact.	1	N/A	0	Potential rate impact.	1	NA	0
	Will stakeholder concerns represent a significant barrier to implementation (or assistance) of the alternative?	N/A	0	Yes	1	N/A	0	Yes	1	NA	0
Stakeholder Issues-Feasibility Score			***0.0***		***1.0***		***0.0***		***1.0***		***0.0***
Comments		N/A		Economic Criteria: Incremental O&M costs for interconnection is based on the WVAWC Rate Schedule for a 4-inch water meter, effective October 11, 2013		N/A		NA		NA	

Instructions: Using the expanded instructions in the "FEASIBILITY STUDY GUIDANCE DOCUMENT", complete the white and gray input cells. Rank each criteria based on the evidence provided and best professional judgement. Rank the criteria 0-3, assuming 0=not feasible and 3=most feasible. The password to edit fillable cells is "swap".

Scoring:

0 – Not feasible. Criterion cannot be met by this alternative and removes the alternative from further consideration.

1 – Feasible but difficult. Criterion represents a significant barrier to successful implementation but does not eliminate it from consideration.

2 – Feasible. Criterion can be met by the alternative.

3 – Very Feasible. Criterion can be easily met by the alternative

Feasibility Matrix **Town of Cedar Grove Water Department** **PWSID: WV3302009** **Date: August 24, 2015** **Completed By: Potesta & Associates, Inc.**

Alternative Strategy Description	Economic Criteria					Technical Criteria							Environmental Criteria						Final Score	Total Capital Cost	Comments
	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	0.0	0.0	**0.0**	**0.0%**	**0.0%**	0.0	0.0	0.0	0.0	**0.0**	**0.0%**	**0.0%**	0.0	0.0	0.0	**0.0**	**0.0%**	**0.0%**	**0.0%**	**N/A**	N/A
Interconnection	2.0	2.0	**4.0**	**66.7%**	**26.7%**	**3.0**	1.0	1.7	1.7	**7.3**	**61.1%**	**24.4%**	2.0	2.0	1.0	**5.0**	**55.6%**	**11.1%**	**62.2%**	**$85,000**	Economic Criteria: Incremental O&M costs for interconnection is based on the WVAWC Rate Schedule for a 4-inch water meter, effective October 11, 2013.
Treated water storage	0.0	0.0	**0.0**	**0.0%**	**0.0%**	0.0	0.0	0.0	0.0	**0.0**	**0.0%**	**0.0%**	0.0	0.0	0.0	**0.0**	**0.0%**	**0.0%**	**0.0%**	**N/A**	N/A
Raw Water Storage	2.0	1.0	**3.0**	**50.0%**	**20.0%**	**1.2**	1.0	2.0	1.3	**5.5**	**46.1%**	**18.4%**	2.0	1.5	1.0	**4.5**	**50.0%**	**10.0%**	**48.4%**	**$2,600,000**	NA
Other-Abandoned Mine Pool Withdrawal	0.0	0.0	**0.0**	**0.0%**	**0.0%**	0.0	0.0	0.0	0.0	**0.0**	**0.0%**	**0.0%**	0.0	0.0	0.0	**0.0**	**0.0%**	**0.0%**	**0.0%**	**NA**	NA

Scoring:

0 – Not feasible. Criterion cannot be met by this alternative and removes the alternative from further consideration.
1 – Feasible but difficult. Criterion represents a significant barrier to successful implementation but does not eliminate it from consideration.
2 – Feasible. Criterion can be met by the alternative.
3 – Very Feasible. Criterion can be easily met by the alternative

APPENDIX B

PRELIMINARY OPINION OF TOTAL ESTIMATED CAPITAL COST FOR RAW WATER STORAGE (OPTION B1)

Regional Intergovernmental Council
SWPP - Town of Cedar Grove Water Department

Item	Description	Unit	Quantity	Unit Price	Estimated Cost
1	Mobilization/Insurance/Bonding	LS	1	$ 80,000.00	$ 80,000.00
2	Property Demolition	LS	1	$ 60,000.00	$ 60,000.00
3	700,000 Gallon Tank (including roof)	EA	2	$ 590,000.00	$ 1,180,000.00
4	Foundation	EA	2	$ 75,000.00	$ 150,000.00
5	Valve Vault/Piping	LS	1	$ 60,000.00	$ 60,000.00
6	Elecrical	LS	1	$ 21,000.00	$ 21,000.00
7	Site Work (grading/stone)	LS	1	$ 15,000.00	$ 15,000.00
8	Fence	LF	450	$ 45.00	$ 20,250.00
9	Gate	EA	1	$ 750.00	$ 750.00
10	Connection to Existing Water Line	EA	1	$ 2,500.00	$ 2,500.00
11	8" DIP Class 50 Water Line	LF	300	$ 60.00	$ 18,000.00
12	Pavement Restoration	LF	150	$ 100.00	$ 15,000.00
	Subtotal:				***$ 1,622,500.00***
	Contingency (20%):				***$ 324,500.00***
	Soft Costs (30%):				***$ 584,100.00***
	TOTAL:				***$ 2,531,100.00***
	SAY:				***$ 2,600,000***

Notes: 1. Soft costs includes engineering, legal, accounting, administrative, land acquisition and other non-construction items.

2. Additional monies would be required if telemetry/controls or mixer required.

3. The unit price of water line includes valving and casing.

PRELIMINARY OPINION OF TOTAL ESTIMATED CAPITAL COST FOR INTERCONNECTION WITH WVAW (OPTION C)

Regional Intergovernmental Council
SWPP - Town of Cedar Grove Water Department

Item	Description	Unit	Quantity	Unit Price	Estimated Cost
1	Connection to Existing Water Line	EA	2	$ 2,500.00	$ 5,000.00
2	8" Gate Valve	EA	2	$ 1,400.00	$ 2,800.00
3	8" DIP Class 50 Water Line	LF	150	$ 40.00	$ 6,000.00
4	16" Steel Casing, Bore and Jack Roadway Crossing	LF	50	$ 180.00	$ 9,000.00
5	Meter Vault/Pressure Reducing Valve	LS	1	$ 25,000.00	$ 25,000.00
6	Concrete Thrust Block, 8" Pipe	CY	14	$ 135.00	$ 1,890.00
	Subtotal:				***$ 49,690.00***
	Contingency (20%):				***$ 9,938.00***
	Soft Costs (40%):				***$ 23,851.20***
	TOTAL:				***$ 83,479.20***
	SAY:				***$ 85,000***

Notes: 1. *It may be possible to eliminate bore and jack roadway crossing if it is determined that existing water lines are under pavement. Additional pavement restoration costs would be required in this scenario.*

2. *Soft costs include engineering, legal, accounting, administrative, land acquisition and other non-construction costs. Soft costs assume that project will not require bond counsel or separate certificate of necessity from West Virginia Public Service Commission.*

3. *Town of Cedar Grove Water Department may be able to "piggyback" this project onto existing water system upgrade project. In addition, Town of Cedar Grove Water Department could review undertaking project as "self-help," resulting in substantial reductions in cost.*

APPENDIX C

HACH®
Be Right™

Quotation

Hach Company
PO Box 608
Loveland, CO 80539-0608
Phone: (800) 227-4224
Email: quotes@hach.com
Website: www.hach.com

Quote Number: 100085723v2
Use quote number at time of order to ensure that you receive prices quoted

Quote Date: 06/05/15

Quote Expiration: 08/04/15

POTESTA & ASSOCIATES, INC.
7012 MACCORKLE AVE SE
CHARLESTON, WV 25304

Name: Angela K. Pugh
Phone: (304)342-1400
Email: akpugh@potesta.com

Customer Account Number: 829990

Sales Contact: Rocky Bragg Email: rbragg@hach.com Phone: 800-227-4224

PRICING QUOTATION

Line	Part Number	Description	Qty	Extended Price
1	580800	Back panel/Trough/Level (required)	1	4,500.00
2	LXV400.99.1A082	MODULE, PROBE (6 SNSR), SC1000	1	1,344.00
3	YAB018	CARD, INTERNAL SC1000, 4 mA INPUTS	1	908.00
4	LXV402.99.00002	db MODULE, DISPLAY W/O GSM, SC1000	1	2,770.00
5	9020000	ASSY, PROBE, LDO MODEL 2, HACH	1	1,804.00
6	DRD1R5-WDMP	ORP Sensor, Ryton, WDMP Mounting	1	904.00
7	DPD1R1-WDMP	pH Sensor, Ryton, WDMP Mounting	1	840.00
8	LXV423.99.10000	SOLITAX t-line sc/immersion probe 0.001-4000 NTU; wiper;PVC	1	3,474.00
9	LXV418.99.50002	db UVAS sc PROBE, 5mm	1	17,305.00
10	WRTUPGWDMP	Comprehensive warranty upgrade includes: Instrument start-up, all parts, labor, and travel for on-site repairs, 4 on-site calibrations per year, factory recommended maintenance (including required parts), unlimited technical support calls, and free firmware updates. On-site response for "down" instrument repairs is typically 3 business days. Standard business hours are 8am-5pm M-F local time, excluding holidays. Please see service terms and conditions for additional details on our service plans, and to ensure you have an opportunity to review our environmental and safety requirements.	1	1,916.00
11	WRTUPGSC1000	Comprehensive warranty upgrade includes: Instrument start-up, all parts, labor, and travel for on-site repairs, 1 on-site factory recommended maintenance (including required parts), unlimited technical support calls, and free firmware updates. On-site response for "down" instrument repairs is typically 3 business days. Standard business hours are 8am-5pm M-F local time, excluding holidays. Please see service terms and conditions for additional details on our service plans, and to ensure you have an opportunity to review our environmental and safety requirements.	1	233.00
12	WRTUPGLDO2	Comprehensive warranty upgrade includes: Instrument start-up, all parts, labor, and travel for on-site repairs, 1 on-site visit for cleaning, inspection, air calibration, and factory recommended maintenance (including required parts), unlimited technical support calls, and free firmware updates. On-site response for "down" instrument repairs is typically 3 business days. Standard business hours are 8am-5pm M-F local time, excluding holidays. Please see service terms and conditions for additional details on our service plans, and to ensure you have an opportunity to review our	1	440.00

Line	Part Number	Description	Qty	Extended Price
		environmental and safety requirements.		
13	WRTUPGGLPHORP	Comprehensive warranty upgrade includes: Instrument start-up, all parts, labor, and travel for on-site repairs, 1 on-site calibration per year, factory recommended maintenance (including required parts), unlimited technical support calls, and free firmware updates. On-site response for "down" instrument repairs is typically 3 business days. Standard business hours are 8am-5pm M-F local time, excluding holidays. Please see service terms and conditions for additional details on our service plans, and to ensure you have an opportunity to review our environmental and safety requirements.	2	442.00
14	WRTUPGSOLITAX	Comprehensive warranty upgrade includes: Instrument start-up, all parts, labor, and travel for on-site repairs, 2 on-site calibrations per year, factory recommended maintenance (including required parts), unlimited technical support calls, and free firmware updates. On-site response for "down" instrument repairs is typically 3 business days. Standard business hours are 8am-5pm M-F local time, excluding holidays. Please see service terms and conditions for additional details on our service plans, and to ensure you have an opportunity to review our environmental and safety requirements.	1	941.00
15	WRTUPGUVAS	Comprehensive warranty upgrade includes: Instrument start-up, all parts, labor, and travel for on-site repairs, 2 on-site calibrations per year, factory recommended maintenance (including required parts), unlimited technical support calls, and free firmware updates. On-site response for "down" instrument repairs is typically 3 business days. Standard business hours are 8am-5pm M-F local time, excluding holidays. Please see service terms and conditions for additional details on our service plans, and to ensure you have an opportunity to review our environmental and safety requirements.	1	1,028.00
			Grand Total	$ 38,849.00

TERMS OF SALE

Freight: Ground Prepay and Add

FOB: Hach's facility

All purchases of Hach Company products and/or services are expressly and without limitation subject to Hach Company's Terms & Conditions of Sale ("Hach TCS"), incorporated herein by reference and published on Hach Company's website at www.hach.com/terms. Hach TCS are contained directly and/or by reference in Hach's offer, order acknowledgment, and invoice documents. The first of the following acts constitutes an acceptance of Hach's offer and not a counteroffer and creates a contract of sale "Contract" in accordance with the Hach TCS: (I) Buyer's issuance of a purchase order document against Hach's offer; (II) acknowledgement of Buyer's order by Hach; or (III) commencement of any performance by Hach pursuant to Buyer's order. Provisions contained in Buyer's purchase documents (including electronic commerce interfaces) that materially alter, add to or subtract from the provisions of the Hach TCS are not part of the Contract.

Due to international regulations, a U.S. Department of Commerce Export License may be required. Hach reserves the right to approve specific shipping agents. Wooden boxes suitable for ocean shipment are extra. Specify final destination to ensure proper documentation and packing suitable for international transport. In addition, Hach may require : 1). A statement of intended end-use; 2).Certification that the intended end-use does not relate to proliferation of weapons of mass destruction (prohibited nuclear end use, chemical / biological weapons, missile technology); and 3). Certification that the goods will not be diverted contrary to U.S. law.

ORDER TERMS:
Terms are Subject to Credit Review
Please reference the quotation number on your purchase order.
Sales tax is not included. Applicable sales tax will be added to the invoice based on the U.S. destination, if applicable provide a resale/exemption certificate.
Shipments will be prepaid and added to invoices unless otherwise specified.
Equipment quoted operates with standard U.S. supply voltage.
Hach standard terms and conditions apply to all sales.
Additional terms and conditions apply to orders for service partnerships.
Prices do not include delivery of product. Reference attached Freight Charge Schedule and Collect Handling Fees.
Standard lead time is 30 days.
This Quote is good for a one time purchase.

Sales Contact:
Name: Rocky Bragg
Title: Regional Sales Manager
Phone: 800-227-4224
Email: rbragg@hach.com

Prepared By:
Name: Rachel Le Blanc
Title: Field Sales Support Specialist II
Phone: 800-227-4224 X 6274
Email: rleblan@hach.com

HACH COMPANY
Headquarters
P.O. Box 389
5600 Lindbergh Drive
Loveland, CO 80539-0389

Purchase Orders
PO Box 608
Loveland, CO 80539-0608

WebSite: www.hach.com

U.S.A.
Phone: 800-227-4224
Fax: 970-669-2932
E-Mail: orders@hach.com
quotes@hach.com
techhelp@hach.com

Export
Phone: 970-669-3050
Fax: 970-461-3939
Email: intl@hach.com

Remittance
2207 Collections Center Drive
Chicago, IL 60693

Wire Transfers
Bank of America
231 S. LaSalle St.
Chicago, IL 60604
Account: 8765602385
Routing (ABA): 071000039

Be Right™

Quotation Addendum

ADVANTAGES OF WORKING WITH HACH

Technical Support	***SIRR Delivery Program***	***Hach WarrantyPlus™ Upgrade***
Provides post-sale instrumentation and application support	*The Scheduled Inventory Reagent Replacement (SIRR) Program offers an uninterrupted supply of reagents*	*Instrument Protection and Service*
✓ Hach's highly skilled Technical Support staff is dedicated to helping you resolve technical issues before, during and after the sale.	✓ Lower inventory costs and fresh supplies	✓ Savings of more than 20% versus a "pay as you go" approach
✓ Available via phone, e-mail, or live online chat at Hach.com!	✓ Reduced paperwork – one purchase order for the entire year	✓ Freedom from maintenance
✓ Toll-free phone: 800-227-4224	✓ Automatic shipments on your schedule	✓ Worry-free compliance with Hach's certification
✓ E-mail: techhelp@hach.com	✓ Easier budgeting	✓ Fixed maintenance budget for the entire year
www.Hach.com	www.Hach.com/sirr	www.Hach.com/warrantyplus

ADVANTAGES OF SIMPLIFIED FREIGHT

Safe & Fast Delivery	***Save Time – Less Hassle***	***Save Money***
✓ Receive tracking numbers on your order acknowledgement	✓ No need to set up deliveries for orders or to schedule pickup	✓ No additional invoice to process – save on time and administrative costs
✓ Hach will assist with claims if an order is lost or damaged in shipment	✓ Hach ships simplified freight orders as the product is available at no additional cost	✓ Only pay shipping once, even if multiple shipments are required

STANDARD SIMPLIFIED FREIGHT CHARGES [1, 2, 3] *Pricing Effective 8/16/2014*

Total Price of Merchandise Ordered	Standard Surface (Mainland USA)	Second Day Delivery (Mainland USA)	Next Day Delivery (Mainland USA)	Second Day Delivery (Alaska & Hawaii)	Next Day Delivery (Alaska & Hawaii)	**Collect** [4] Handling Fee *Effective 8/16/2014*
$0.00 - $49.99	$11.99	$29.99	$54.99	$44.95	$85.45	$7.79
$50.00 - $199.99	$17.79	$52.45	$98.97	$71.64	$136.19	$7.99
$200.00 - $449.99	$30.89	$79.43	$161.79	$100.23	$195.06	$8.47
$450.00 - $749.99	$41.67	$108.95	$216.68	$136.20	$263.73	$8.89
$750.00 - $999.99	$52.77	$114.40	$239.39	$141.65	$267.00	$9.17
$1,000.00 - $2,249.99	$66.39	$130.75	$255.01	$154.73	$307.33	$9.49
$2,250.00 - $4,999.99	$79.47	$174.35	$294.25	$181.98	$336.76	$11.32
$5,000.00 - $9,999.99	$112.79	$201.60	$338.94	$213.59	$365.10	$16.83
Over $10,000	2% of Net Order Value	4% of Net Order Value	6% of Net Order Value	4% of Net Order Value	6% of Net Order Value	$29.49

1 Freight charges shown are only applicable to orders billing and shipping to U.S. destinations. Freight charges will be prepaid and added to invoice. Freight for the Reagent Delivery Program is charged on each shipment release and is based on the total price of each shipment release. Freight charges are subject to change without notice.

2 Additional freight charges will be applied to orders containing bulky and/or especially heavy orders. Refrigerated and all weather Samplers do not qualify for simplified freight charges, and are considered heavy freight. Dissolved Oxygen Sensors can be damaged if exposed to temps below freezing, causing sensor failure. Must be shipped over night or 2nd day air during the cold weather months.

3 Orders shipping to Alaska or Hawaii: Additional freight charges may be applied at time of order processing. Second Day and Next Day delivery is not available to all destinations.

4 Hach Company will assess a collect handling fee on orders with collect freight terms. This handling fee covers the additional costs that Hach Company incurs from processing and managing collect shipments.

SALES TAX

Sales Tax is not included in the attached quotation. Applicable sales and usage taxes will be added to your invoice, at the time of order, based on U.S. destination of goods, unless a valid resale/exemption certificate for destination state is provided to the above address or fax number, attention of the Tax Dept.

TERMS & CONDITIONS OF SALE FOR HACH COMPANY PRODUCTS AND SERVICES

This document sets forth the Terms & Conditions of Sale for goods manufactured and/or supplied, and services provided, by Hach Company of Loveland, Colorado ("Hach") and sold to the original purchaser thereof ("Buyer"). Unless otherwise specifically stated herein, the term "Hach" includes only Hach Company and none of its affiliates. Unless otherwise specifically stated in a previously-executed written purchase agreement signed by authorized representatives of Hach and Buyer, these Terms & Conditions of Sale establish the rights, obligations and remedies of Hach and Buyer which apply to this offer and any resulting order or contract for the sale of Hach's goods and/or services ("Products").

1. APPLICABLE TERMS & CONDITIONS: These Terms & Conditions of Sale are contained directly and/or by reference in Hach's offer, order acknowledgment, and invoice documents. The first of the following acts constitutes an acceptance of Hach's offer and not a counteroffer and creates a contract of sale ("Contract") in accordance with these Terms & Conditions: (i) Buyer's issuance of a purchase order document against Hach's offer; (ii) acknowledgement of Buyer's order by Hach; or (iii) commencement of any performance by Hach pursuant to Buyer's order. Provisions contained in Buyer's purchase documents (including electronic commerce interfaces) that materially alter, add to or subtract from the provisions of these Terms & Conditions of Sale are not a part of the Contract.

2. CANCELLATION: Buyer may cancel goods orders subject to fair charges for Hach's expenses including handling, inspection, restocking, freight and invoicing charges as applicable, provided that Buyer returns such goods to Hach at Buyer's expense within 30 days of delivery and in the same condition as received. Buyer may cancel service orders on ninety (90) day's prior written notice and refunds will be prorated based on the duration of the service plan. Inspections and re-instatement fees may apply upon cancellation or expiration of service programs. Seller may cancel all or part of any order prior to delivery without liability if the order includes any Products that Seller determines may not comply with export, safety, local certification, or other applicable compliance requirements.

3. DELIVERY: Delivery will be accomplished FCA Hach's facility located in Ames, Iowa or Loveland, Colorado, United States (Incoterms 2010). For orders having a final destination within the U.S., legal title and risk of loss or damage pass to Buyer upon transfer to the first carrier. For orders having a final destination outside the U.S., legal title and risk of loss or damage pass to Buyer when the Products enter international waters or airspace or cross an international frontier. Hach will use commercially reasonable efforts to deliver the Products ordered herein within the time specified on the face of this Contract or, if no time is specified, within Hach's normal lead-time necessary for Hach to deliver the Products sold hereunder. Upon prior agreement with Buyer and for an additional charge, Hach will deliver the Products on an expedited basis. Standard service delivery hours are 8 am – 5 pm Monday through Friday, excluding holidays.

4. INSPECTION: Buyer will promptly inspect and accept any Products delivered pursuant to this Contract after receipt of such Products. In the event the Products do not conform to any applicable specifications, Buyer will promptly notify Hach of such nonconformance in writing. Hach will have a reasonable opportunity to repair or replace the nonconforming product at its option. Buyer will be deemed to have accepted any Products delivered hereunder and to have waived any such nonconformance in the event such a written notification is not received by Hach within thirty (30) days of delivery.

5. PRICES & ORDER SIZES: All prices are in U.S. dollars and are based on delivery as stated above. Prices do not include any charges for services such as insurance; brokerage fees; sales, use, inventory or excise taxes; import or export duties; special financing fees; VAT, income or royalty taxes imposed outside the U.S.; consular fees; special permits or licenses; or other charges imposed upon the production, sale, distribution, or delivery of Products. Buyer will either pay any and all such charges or provide Hach with acceptable exemption certificates, which obligation survives performance under this Contract. Hach reserves the right to establish minimum order sizes and will advise Buyer accordingly.

6. PAYMENTS: All payments must be made in U.S. dollars. For Internet orders, the purchase price is due at the time and manner set forth at www.hach.com. Invoices for all other orders are due and payable NET 30 DAYS from date of the invoice without regard to delays for inspection or transportation, with payments to be made by check to Hach at the above address or by wire transfer to the account stated on the front of Hach's invoice, or for customers with no established credit, Hach may require cash or credit card payment in advance of delivery. In the event payments are not made or not made in a timely manner, Hach may, in addition to all other remedies provided at law, either: (a) declare Buyer's performance in breach and terminate this Contract for default; (b) withhold future shipments until delinquent payments are made; (c) deliver future shipments on a cash-with-order or cash-in-advance basis even after the delinquency is cured; (d) charge interest on the delinquency at a rate of 1-1/2% per month or the maximum rate permitted by law, if lower, for each month or part thereof of delinquency in payment plus applicable storage charges and/or inventory carrying charges; (e) repossess the Products for which payment has not been made; (f) recover all costs of collection including reasonable attorney's fees; or (g) combine any of the above rights and remedies as is practicable and permitted by law. Buyer is prohibited from setting off any and all monies owed under this from any other sums, whether liquidated or not, that are or may be due Buyer, which arise out of a different transaction with Hach or any of its affiliates. Should Buyer's financial responsibility become unsatisfactory to Hach in its reasonable discretion, Hach may require cash payment or other security. If Buyer fails to meet these requirements, Hach may treat such failure as reasonable grounds for repudiation of this Contract, in which case reasonable cancellation charges shall be due Hach. Buyer grants Hach a security interest in the Products to secure payment in full, which payment releases the security interest but only if such payments could not be considered an avoidable transfer under the U.S. Bankruptcy Code or other applicable laws. Buyer's insolvency, bankruptcy, assignment for the benefit of creditors, or dissolution or termination of the existence of Buyer, constitutes a default under this Contract and affords Hach all the remedies of a secured party under the U.C.C., as well as the remedies stated above for late payment or non-payment.

7. LIMITED WARRANTY: Hach warrants that Products sold hereunder will be free from defects in material and workmanship and will, when used in accordance with the manufacturer's operating and maintenance instructions, conform to any express written warranty pertaining to the specific goods purchased, which for most Hach instruments is for a period of twelve (12) months from delivery. Hach warrants that services furnished hereunder will be free from defects in workmanship for a period of ninety (90) days from the completion of the services. Parts provided by Hach in the performance of services may be new or refurbished parts functioning equivalent to new parts. Any non-functioning parts that are repaired by Hach shall become the property of Hach. No warranties are extended to consumable items such as, without limitation, reagents, batteries, mercury cells, and light bulbs. **All other guarantees, warranties, conditions and representations, either express or implied, whether arising under any statute, law, commercial usage or otherwise, including implied warranties of merchantability and fitness for a particular purpose, are hereby excluded.** The sole remedy for Products not meeting this Limited Warranty is replacement, credit or refund of the purchase price. This remedy will not be deemed to have failed of its essential purpose so long as Hach is willing to provide such replacement, credit or refund.

8. INDEMNIFICATION: Indemnification applies to a party and to such party's successors-in-interest, assignees, affiliates, directors, officers, and employees ("Indemnified Parties"). Hach is responsible for and will defend, indemnify and hold harmless the Buyer Indemnified Parties against all losses, claims, expenses or damages which may result from accident, injury, damage, or death due to Hach's breach of the Limited Warranty. This indemnification is provided on the condition that the Buyer is likewise responsible for and will defend, indemnify and hold harmless the Hach Indemnified Parties against all losses, claims, expenses or damages which may result from accident, injury, damage, or death due to the negligence or misuse or misapplication of any goods or services by the Buyer or any third party affiliated or in privity with Buyer.

9. PATENT PROTECTION: Subject to all limitations of liability provided herein, Hach will, with respect to any Products of Hach's design or manufacture, indemnify Buyer from any and all damages and costs as finally determined by a court of competent jurisdiction in any suit for infringement of any U.S. patent (or European patent for Products that Hach sells to Buyer for end use in a member state of the E.U.) that has issued as of the delivery date, solely by reason of the sale or normal use of any Products sold to Buyer hereunder and from reasonable expenses incurred by Buyer in defense of such suit if Hach does not undertake the defense thereof, provided that Buyer promptly notifies Hach of such suit and offers Hach either (i) full and exclusive control of the defense of such suit when Products of Hach only are involved, or (ii) the right to participate in the defense of such suit when products other than those of Hach are also involved. Hach's warranty as to use patents only applies to infringement arising solely out of the inherent operation of the Products according to their applications as envisioned by Hach's specifications. In case the Products are in such suit held to constitute infringement and the use of the Products is enjoined, Hach will, at its own expense and at its option, either procure for Buyer the right to continue using such Products or replace them with non-infringing products, or modify them so they become non-infringing, or remove the Products and refund the purchase price (prorated for depreciation) and the transportation costs thereof. The foregoing states the entire liability of Hach for patent infringement by the Products. Further, to the same extent as set forth in Hach's above obligation to Buyer, Buyer agrees to defend, indemnify and hold harmless Hach for patent infringement related to (x) any goods manufactured to the Buyer's design, (y) services provided in accordance with the Buyer's instructions, or (z) Hach's Products when used in combination with any other devices, parts or software not provided by Hach hereunder.

10. TRADEMARKS AND OTHER LABELS: Buyer agrees not to remove or alter any indicia of manufacturing origin or patent numbers contained on or within the Products, including without limitation the serial numbers or trademarks on nameplates or cast, molded or machined components.

11. SOFTWARE. All licenses to Hach's separately-provided software products are subject to the separate software license agreement(s) accompanying the software media. In the absence of such terms and for all other software, Hach grants Buyer only a personal, non-exclusive license to access and use the software provided by Hach with Products purchased hereunder solely as necessary for Buyer to enjoy the benefit of the Products. A portion of the software may contain or consist of open source software, which Buyer may use under the terms and conditions of the specific license under which the open source software is distributed. Buyer agrees that it will be bound by any and all such license agreements. Title to software remains with the applicable licensor(s).

12. PROPRIETARY INFORMATION; PRIVACY: "Proprietary Information" means any information, technical data or know-how in whatever form, whether documented, contained in machine readable or physical components, mask works or artwork, or otherwise, which Hach considers proprietary, including but not limited to service and maintenance manuals. Buyer and its customers, employees and agents will keep confidential all such Proprietary Information obtained directly or indirectly from Hach and will not transfer or disclose it without Hach's prior written consent, or use it for the manufacture, procurement, servicing or calibration of Products or any similar products, or cause such products to be manufactured, serviced or calibrated by or procured from any other source, or reproduce or otherwise appropriate it. All such Proprietary Information remains Hach's property. No right or license is granted to Buyer or its customers, employees or agents, expressly or by implication, with respect to the Proprietary Information or any patent right or other proprietary right of Hach, except for the limited use licenses implied by law. Hach will manage Customer's information and personal data in accordance with its Privacy Policy, located at http://www.hach.com/privacypolicy.

13. CHANGES AND ADDITIONAL CHARGES: Hach reserves the right to make design changes or improvements to any products of the same general class as Products being delivered hereunder without liability or obligation to incorporate such changes or improvements to Products ordered by Buyer unless agreed upon in writing before the Products' delivery date. Services which must be performed as a result of any of the following conditions are subject to additional charges for labor, travel and parts: (a) equipment alterations not authorized in writing by Hach; (b) damage resulting from improper use or handling, accident, neglect, power surge, or operation in an environment or manner in which the instrument is not designed to operate or is not in accordance with Hach's operating manuals; (c) the use of parts or accessories not provided by Hach; (d) damage resulting from acts of war, terrorism or nature; (e) services outside standard business hours; (f) site prework not complete per proposal; or (g) any repairs required to ensure equipment meets manufacturer's specifications upon activation of a service agreement.

14. SITE ACCESS / PREPARATION / WORKER SAFETY / ENVIRONMENTAL COMPLIANCE: In connection with services provided by Hach, Buyer agrees to permit prompt access to equipment. Buyer assumes full responsibility to back-up or otherwise protect its data against loss, damage or destruction before services are performed. Buyer is the operator and in full control of its premises, including those areas where Hach employees or contractors are performing service, repair and maintenance activities. Buyer will ensure that all necessary measures are taken for safety and security of working conditions, sites and installations during the performance of services. Buyer is the generator of any resulting wastes, including without limitation hazardous wastes. Buyer is solely responsible to arrange for the disposal of any wastes at its own expense. Buyer will, at its own expense, provide Hach employees and contractors working on Buyer's premises with all information and training required under applicable safety compliance regulations and Buyer's policies. If the instrument to be serviced is in a Confined Space, as that term is defined under OSHA regulations, Buyer is solely responsible to make it available to be serviced in an unconfined space. Hach service technicians will not work in Confined Spaces. In the event that a Buyer requires Hach employees or contractors to attend safety or compliance training programs provided by Buyer, Buyer will pay Hach the standard hourly rate and expense reimbursement for such training attended. The attendance at or completion of such training does not create or expand any warranty or obligation of Hach and does not serve to alter, amend, limit or supersede any part of this Contract.

15. LIMITATIONS ON USE: Buyer will not use any Products for any purpose other than those identified in Hach's catalogs and literature as intended uses. Unless Hach has advised the Buyer in writing, in no event will Buyer use any Products in drugs, food additives, food or cosmetics, or medical applications for humans or animals. In no event will Buyer use in any application any Product that requires FDA 510(k) clearance unless and only to the extent the Product has such clearance. Any warranty granted by Hach is void if any goods covered by such warranty are used for any purpose not permitted hereunder.

16. EXPORT AND IMPORT LICENSES AND COMPLIANCE WITH LAWS: Unless otherwise specified in this Contract, Buyer is responsible for obtaining any required export or import licenses. Hach represents that all Products delivered hereunder will be produced and supplied in compliance with all applicable laws and regulations. Buyer will comply with all laws and regulations applicable to the installation or use of all Products, including applicable import and export control laws and regulations of the U.S., E.U. and any other country having proper jurisdiction, and will obtain all necessary export licenses in connection with any subsequent export, re-export, transfer and use of all Products and technology delivered hereunder. Buyer will not sell, transfer, export or re-export any Hach Products or technology for use in activities which involve the design, development, production, use or stockpiling of nuclear, chemical or biological weapons or missiles, nor use Hach Products or technology in any facility which engages in activities relating to such weapons. Buyer will comply with all local, national, and other laws of all jurisdictions globally relating to anti-corruption, bribery, extortion, kickbacks, or similar matters which are applicable to Buyer's business activities in connection with this Contract, including but not limited to the U.S. Foreign Corrupt Practices Act of 1977, as amended (the "FCPA"). Buyer agrees that no payment of money or provision of anything of value will be offered, promised, paid or transferred, directly or indirectly, by any person or entity, to any government official, government employee, or employee of any company owned in part by a government, political party, political party official, or candidate for any government office or political party office to induce such organizations or persons to use their authority or influence to obtain or retain an improper business advantage for Buyer or for Hach, or which otherwise constitute or have the purpose or effect of public or commercial bribery, acceptance of or acquiescence in extortion, kickbacks or other unlawful or improper means of obtaining business or any improper advantage, with respect to any of Buyer's activities related to this Contract. Hach asks Buyer to "*Speak Up*!" if aware of any violation of law, regulation or our Standards of Conduct ("SOC") in relation to this Contract. See http://danaher.com/integrity-and-compliance and www.danaherintegrity.com for a copy of the SOC and for access to our Helpline portal.

17. FORCE MAJEURE: Hach is excused from performance of its obligations under this Contract to the extent caused by acts or omissions that are beyond its control of, including but not limited to Government embargoes, blockages, seizures or freeze of assets, delays or refusals to grant an export or import license or the suspension or revocation thereof, or any other acts of any Government; fires, floods, severe weather conditions, or any other acts of God; quarantines; labor strikes or lockouts; riots; strife; insurrections; civil disobedience or acts of criminals or terrorists; war; material shortages or delays in deliveries to Hach by third parties. In the event of the existence of any force majeure circumstances, the period of time for delivery, payment terms and payments under any letters of credit will be extended for a period of time equal to the period of delay. If the force majeure circumstances extend for six months, Hach may, at its option, terminate this Contract without penalty and without being deemed in default or in breach thereof.

18. NON ASSIGNMENT AND WAIVER: Buyer will not transfer or assign this Contract or any rights or interests hereunder without Hach's prior written consent. Failure of either party to insist upon strict performance of any provision of this Contract, or to exercise any right or privilege contained herein, or the waiver of any breach of the terms or conditions of this Contract will not be construed as thereafter waiving any such terms, conditions, rights, or privileges, and the same will continue and remain in force and effect as if no waiver had occurred.

19. LIMITATION OF LIABILITY: None of the Hach Indemnified Parties will be liable to Buyer under any circumstances for any special, treble, incidental or consequential damages, including without limitation, damage to or loss of property other than for the Products purchased hereunder; damages incurred in installation, repair or replacement; lost profits, revenue or opportunity; loss of use; losses resulting from or related to downtime of the products or inaccurate measurements or reporting; the cost of substitute products; or claims of Buyer's customers for such damages, howsoever caused, and whether based on warranty, contract, and/or tort (including negligence, strict liability or otherwise). The total liability of the Hach Indemnified Parties arising out of the performance or nonperformance hereunder or Hach's obligations in connection with the design, manufacture, sale, delivery, and/or use of Products will in no circumstance exceed in the aggregate a sum equal to twice the amount actually paid to Hach for Products delivered hereunder.

20. APPLICABLE LAW AND DISPUTE RESOLUTION: The construction, interpretation and performance hereof and all transactions hereunder shall be governed by the laws of the State of Colorado, without regard to its principles or laws regarding conflicts of laws. If any provision of this Contract violates any Federal, State or local statutes or regulations of any countries having jurisdiction of this transaction, or is illegal for any reason, said provision shall be self-deleting without affecting the validity of the remaining provisions. Unless otherwise specifically agreed upon in writing between Hach and Buyer, any dispute relating to this Contract which is not resolved by the parties shall be adjudicated in order of preference by a court of competent jurisdiction (i) in the State of Colorado, U.S.A. if Buyer has minimum contacts with Colorado and the U.S., (ii) elsewhere in the U.S. if Buyer has minimum contacts with the U.S. but not Colorado, or (iii) in a neutral location if Buyer does not have minimum contacts with the United States.

21. ENTIRE AGREEMENT & MODIFICATION: These Terms & Conditions of Sale constitute the entire agreement between the parties and supersede any prior agreements or representations, whether oral or written. No change to or modification of these Terms & Conditions shall be binding upon Hach unless in a written instrument specifically referencing that it is amending these Terms & Conditions of Sale and signed by an authorized representative of Hach. Hach rejects any additional or inconsistent Terms & Conditions of Sale offered by Buyer at any time, whether or not such terms or conditions materially alter the Terms & Conditions herein and irrespective of Hach's acceptance of Buyer's order for the described goods and services.

* * *

APPENDIX D

WATER SYTEMS EMERGENCY GENERATOR DATA

PWS ID	SYSTEM NAME	COUNTY	DISTRICT
WV3302009	CEDAR GROVE, COMMUNITY OF	KANAWHA	DIST2

GENERATOR DATA

EXISTING	NUMBER	FACILITY SERVED	GENERATOR LOCATION
NO	1	TREATMENT PLANT	TREATMENT PLANT LOCATED IN TOWN OF CEDAR GROVE

SIZE

KVA	KW	LOAD
250	200	300

AMPERES

LOAD BASIS
75% OF 400 AMP MAIN BREAKER

VOLTAGE

VOLTS	PHASES
277 / 480	3 PHASE WYE

FUEL

TYPE	TANK	SIZE
DIESEL	ATTACHED	120 GALLON

GENERATOR CONNECTION POINT

LOAD SIDE OF MAIN DISCONNECT SWITCH SECOND FLOOR OF BUILDING

GENERATOR CABLES

SIZE	SIZE NOTES
250 MCM	TYPE W PORTABLE POWER CABLE

LENGTH	LENGTH NOTES
70 FEET	70 FEET LENGTH OF CABLE (4 CONDUCTOR WITH GROUND)

OTHER INFORMATION (electrician, fuel supplier, etc.)

(A) NO EXISTING TRANSFER SWITCH (B) NO ON SITE FUEL STORAGE (C) WILL NEED ELECTRICIAN (D) 80% POWER FACTOR USED IN CALCULATIONS

APPENDIX E. SUPPORTING DOCUMENTATION

E-1. Protection Team Meeting

Date: 6/7/2016

Location: Cedar Grove, WV

Participants: Mayor James Hudnall, Chief Operator Kenneth Barton, James Confere, Michael D. Coleman, John Quells, Robert Burdette, Wayne Armstrong, and Tetra Tech representative Russell Myers

- On Tuesday June 7, 2016, the Source Water Protection Team for the Town of Cedar Grove met to review and update the draft of the SWPP. Kenneth Barton arranged the meeting and contacted the affected residents. A few of the participants were representatives from Glasgow. All required members of the team were present, and a representative of the Kanawha County Health Department will participate in the future.
- Russell presented a Powerpoint presentation with highlights of the SWPP draft and accepted comments from the group.
    - The total customers served by the town of Glasgow is 362. The other two estimates are accurate.
    - The current treatment capacity of the plant is around 1,000,000 gallons, which is also the maximum amount that was produced in the last year. The minimum amount produced in the last year was 520,000 gallons. The treatment plant is staffed and operated an average of 18 hours/day. The maximum hours of operation were 24 hours and the minimum hours of operation were 11-12 hours.
    - Cedar Grove has 2 tanks with a total capacity of 300,000 gallons. East Bank has 1 tank with capacity of 125,000 gal., and Glasgow has 2 tanks with a combined capacity of 169,000 gallons. The total storage capacity that is available to Cedar Grove is 594,000 gallons.
    - The raw water intake was constructed around 1945 but modified around 1980.
    - The wastewater systems upstream of the plant are still the priority, especially the Glasgow Sewer Treatment Plant. The water operators maintain constant communication with the plant, who would notify them of any problems.
    - The team suggested that Industry be moved to the 4th priority. Other than that, the team was satisfied with the priorities list.
    - The team suggested that plant tours be removed from the list.
    - Table 11: The utility has no capacity to switch to an alternative water source. The intake can be closed by closing a valve switch in the raw water line and shutting down the pumps in a few minutes. The storage volume needs updated in this table. The water system is a member of WV Rural Water but not the emergency response team. The system has informal mutual aid agreements with Glasgow and East Bank for parts and assistance during an emergency.
    - Note: The generator capacity information was not in the Potesta Report. The treatment plant can power the intake pumps and they do not have any booster pumps. The plant would require a 200 kW 3-Phase Diesel generator (according to DHHR report) and would require electrical work. They do not have any fuel storage capacity.

- The Walker Cat facility would be the primary source for rental generators, remove the Mountaineer Generator in Elkins. Their primary fuel supplier would be KRT in Marmet. They do not have generators to test or maintain.
- The water system receives spill notifications from the DHHR (Chris Farrish, JD Douglas)
- The team updated the emergency contact information on the short form, and added the East Bank Middle School to the sensitive populations.
- Cedar Grove Water does have an emergency response plan, but the operator is unsure when it was last updated.

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.

Cedar Grove Designees:

Name	Title	Phone	Email	Signature	Date
James B Hudnall	MAYOR	380-4119			6-7-16
Kenneth Barton	WPO II	304-595-2491		Kenneth Barton	6-7-16
James Confere	CEDAR GROVE VOL FIREDEPT	304-744-2483		James B Confere	6-7-16
Michael D. Coleman	FIRE CHIEF CEDAR GROVE	304-389-7912		Michael D. Coleman	6/7/16
John Quells	Town of Glasgow W/D	304-415-6424		John Quells	6/7/16
Robert Bundette	Class III Cedar Grove	304-595-2991		Robert Bundette	6/7/16
Wayne Armstrong	Mayor Glasgow	304-437-0143	Glasgowmayore outlook.com	Wayne Armstrong	6/7/16

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

Cedar Grove Municipal Water

Source Water Protection Plan - Public Meeting

Date 6/7/2016

Attendees:

Name	Organization	Email	Phone
Melissa Young			
Laurence L. Roark			
Kenneth Barton	Town Council		
James B Hudnall	MAYOR		
Carolyn Bennett			
JAMES BLANKENSHIP			
BRANTY D. GIBSON			
Jean Cary	Citizen		
[illegible]			
Janice Conley			
[illegible]			
[illegible]			

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

Cedar Grove Municipal Water

Source Water Protection Plan - Public Meeting

Date 6-7-16

Attendees:

Name	Organization	Email	Phone
James Confere	CG VFD		[redacted]

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

Town of Cedar Grove Water Department
302 Alexander St.
Cedar Grove, WV 25039
304-595-2991

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.

Cedar Grove Water Department treats water from the Kanawha River using conventional treatment methods. The Kanawha is used heavily for transportation, electricity generation, and recreation. There are many ways you can help minimize impacts from these and other 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.