Source Water Protection Plan
Cowen Public Service District

PWSID WV3305103

Webster County

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In cooperation with Cowen PSD

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

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

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Title of Authorizing Signatory:

5/20/2016

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

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

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

2.0 BACKGROUND: WV SOURCE WATER ASSESSMENT AND PROTECTION PROGRAM

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

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

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

3.0 STATE REGULATORY REQUIREMENTS

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

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

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

4.0 SYSTEM INFORMATION

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

Table 1. Population Served by Cowen PSD

Administrative office location:	Route 20 Cowen WV 26206		
Is the system a public utility, according to the Public Service Commission rule?	Yes		
Date of Most Recent Source Water Assessment Report:	December 2002		
Date of Most Recent Source Water Protection Plan:	March 2011		
Population served directly:	The utility directly serves approximately 1,318 customers, or around 3,295 people*.		
Bulk Water Purchaser Systems:	**System Name**	**PWSID Number**	**Population**
	Camden on Gauley	WV3305107	40 customers, or around 100 people*
Total Population Served by the Utility:	The total population served by the water system is approximately 3,395 people (customers served both directly and indirectly).		
Does the utility have multiple source water protection areas (SWPAs)?	No		
How many SWPAs does the utility have?	1		

*Estimated population served from the 2015 PSC Annual Report for Cowen PSD. Population served is the number of customers multiplied by 2.5.

5.0 WATER TREATMENT AND STORAGE

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

Table 2. Cowen PSD Water Treatment Information

Water Treatment Processes (List All Processes in Order)	Water treatment processes include chemical coagulation, flocculation, sedimentation, filtration, disinfection, fluoridation.
Current Treatment Capacity (gal/day)	The current capacity of the water treatment plant is around 648,000 gallons/day.
Current Average Production (gal/day)	The plant currently produces an average of 312,000 gallons/day.
Maximum Quantity Treated and Produced (gal)	According to recent monthly operating reports, the maximum quantity of treated water produced in the last year was 603,000 gallons on 12/23/2013.
Minimum Quantity Treated and Produced (gal)	According to recent monthly operating reports, the minimum quantity produced in the last year was 100,000 gallons on 8/29/2013.
Average Hours of Operation	The treatment plant is staffed and operated an average of 11-16 hours/day.
Maximum Hours of Operation in One Day	The maximum hours of operation in the last year was 24 hours.
Minimum Hours of Operation in One Day	The minimum hours of operation in the last year was 6 hours.
Number of Storage Tanks Maintained	The water system maintains 6 treated water storage tanks and 3 booster pump stations.
Total Gallons of Treated Water Storage (gal)	Total treated water storage capacity is around 933,000 gallons.
Total Gallons of Raw Water Storage (gal)	Cowen PSD does not have any raw water storage capacity.

Table 3. Cowen PSD Surface Water Sources

Intake Name	SDWIS #	Local Name	Describe Intake	Name of Water Source	Date Constructed / Modified	Frequency of Use (Primary/ Backup/ Emergency)	Activity Status (Active/ Inactive)
Gauley River Intake	IN001	Cowen Water Plant Intake	There are 2 10” intake pipes located in a concrete basin with holes in it to allow raw water to enter the intake while screening out some debris.	Gauley River	1967	Primary	Active

Table 4. Cowen PSD Groundwater Sources

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

6.0 DELINEATIONS

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

The WSDA includes the entire watershed area upstream of the intake to the boundary of the State of West Virginia border or a topographic boundary. The ZCC for a public surface water supply is a corridor along streams within the watershed that warrants more detailed scrutiny due to its proximity to the surface water intake and the intake's susceptibility to potential contaminants within that corridor. The ZCC is determined using a mathematical model that accounts for stream flows, gradient and area topography. The length of the ZCC is based on a five-hour time-of-travel of water in the streams to the water intake, plus an additional one-quarter mile below the water intake. Ohio River ZCC delineations are based on ORSANCO guidance and extend 25 miles above the intake. The width of the zone of critical concern is 1,000 feet measured horizontally from each bank of the principal stream and 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 approximately 246 square miles.
River Watershed Name (8-digit HUC)	Gauley River Watershed, HUC 05050005
Size of Zone of Critical Concern (Acres)	The ZCC covers approximately 11,517 acres.
Size of Zone of Peripheral Concern (Acres) (Include ZCC area)	The ZPC covers approximately 26,802 acres.
Method of Delineation for Groundwater Sources	The water system does not have any ground water sources.
Area of Wellhead Protection Area (Acres)	N/A

7.0 PROTECTION TEAM

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

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

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

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

Table 6. Protection Team Member and Contact Information

Name	Representing	Title	Phone Number	Email
Terry Wayne	Cowen PSD	General Manager	304-618-1604	cowenpsd@frontiernet.net
Craig Ray	Cowen PSD	Chief Operator	304-226-3541	-
Joseph Garland	Cowen PSD	Operator	304-226-3541	-
Lance Bragg	Cowen Volunteer Fire Department	Chief	304-226-3191	cowenfire@yahoo.com
Rick Shaver	West Virginia Department of Health and Human Resources	Geologist	304-356-4296	richard.k.shaver@wv.gov
Richard Rose	Webster County Emergency Services	Director	304-847-2122	websteroes@citilink.net
Steve Wayne	-	-	[redacted]	-
George Clutter	Webster County Health Department	-	304-847-5483	george.f.clutter@wv.gov
Date of first protection Team Meeting		4/12/2016		
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 Cowen PSD first met on 4/12/2016 at the PSD office in Cowen. Terry Wayne contacted the recommended members by phone and arranged the meeting. All recommended team members were present except a PSD board member and the Webster County Health department representative, but these groups will be involved in future planning efforts. The water system also held a public meeting on 5/6/2016 at the Cowen PSD office. 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 the source water assessment reports and source water protection plans. Regulated PSSCs are derived from federal and state regulated databases, and may include data from WVDEP, US Environmental Protection Agency, WVDHSEM, and 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 Cowen PSD are identified in the communication planning section of the source water protection plan.

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

8.2 LOCAL AND REGIONAL PSSCS

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

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

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

Table 7. Locally Identified Potential Sources of Significant Contamination

PSSC Number	Map Code	Site Name	Site Description	Relative Risk Score	Comments
21	I-34	Reservoir	Camp Caesar Lake	4.1	-
22	I-16	Storage Pond	Storage pond for surface mine runoff	5.1	-

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

9.0 IMPLEMENTATION PLAN FOR MANAGEMENT STRATEGIES

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

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

Proposed commitments and schedules may change, but should be well documented and reported to the local stakeholders. If possible, utilities should include cost estimates for strategies to better plan for implementation and possible funding opportunities. Cowen PSD 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
Coal Mining Activities and Abandoned Coal Mine Coarse Rejects	1	There are several major surface mining operations in and around the ZCC. Increased effects of acid mine drainage and the effects of water treatment for acid mine drainage are concerns of the water system. If not properly treated acid mine drainage from mine lands may impact the pH, iron, and manganese levels in the water. In addition, coarse rejects from coal mining operations are buried at a site within the watershed, referred to locally as the "gob pile". Leachate from this area may impact the water quality of the stream.
Highway/Railway Traffic	2	The highway runs parallel to the source through the ZCC. If an accident were to occur on or along the river, it may be difficult to contain spill materials and these could potentially contaminate the surface water. Future mining, current timbering activities, propane storage and sales, and the new WVDOH headquarters will all increase traffic in the ZCC.
Impoundments and Sedimentation Ponds	3	Camp Caesar Lake is located just north of the water treatment plant for Cowen and feeds into the Gauley River above the raw water intake. The impoundment is created by an earthen dam. Utility staff suggested that this could be a potential hazard for the water system if there were any major leaks or breaks from the dam. Water quality downstream or the treatment plant itself could be severely impacted by a large release, at least for a short time. Information about a few of these locally identified PSSCs is provided in **Table 7** and **Figure A-3**.
Propane Storage and Future Site for Propane Sales	4	While propane does not pose a threat to the source water, other activities associated with the site may. For instance if tanks are cleaned and maintained on site, those by-products may contaminate the source water if not contained and disposed of properly. In addition, truck traffic will increase to the site and through the ZCC, posing a greater risk for accidental spills discussed below in Highway Traffic.

PSSC or Critical Area	Priority Number	Reason for Concern
Inundation of Organic Materials and Water Quality Variation	5	Because the water level in the Gauley River fluctuates based on rainfall and the ZCC is heavily forested, fallen leaves collect in the pools above the intake in the fall season. When the pools are flushed out during a rain event, the leaves inundate the intake structure and must be cleared by hand. Occasionally, unusual feeds of chlorine are required to maintain proper chlorine residual levels in the treated water. The cause is unknown, but may be associated with the standing water and decaying leaves.
Waste Water Lines near Intake	6	There are waste water pipes located just upstream of the raw water intake. Untreated waste water leaking from these collection lines could potentially migrate into the surface water source, resulting in contamination.
Power line, pipeline, and highway rights-of-way	7	Rights-of-way are typically maintained with herbicides that can migrate into the water supply.

Table 9. Priority PSSC Management Strategies

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
Previous Plan Status	There were 7 management strategies recommended in the existing plan. 2 of these strategies have either been implemented or addressed priorities that are no longer a concern. 5 of these address ongoing concerns. These are incorporated in this plan update and listed below.	-	-	-	-
Yearly Windshield Survey	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	Water utility staff	Yearly, next survey in 2017	-	Minimal cost associated with staff time

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
	year's survey. These changes will be documented and reflected in future source water protection plan updates.				
Regular Coordination with Emergency Managers	Utility staff will continue to communicate with these emergency services groups on a regular basis, especially when there is not an ongoing emergency. They will meet yearly as part of the Source Water Protection Team.	Water utility staff and emergency personnel	Yearly during regular Protection Team Meetings	-	Minimal cost associated with staff time
Yearly Source Water Protection Team Meetings	The Protection Team for Cowen PSD will meet on a yearly basis to discuss any changes that might have occurred within the watershed or to find replacements for members who can no longer participate.	Source Water Protection Team	Yearly, next meeting in 2017	-	Minimal cost associated with staff time
Future Mining Activities and Abandoned Coal Mine Coarse Rejects	Staff will continue to be aware of mining activities in order to prepare for any water quality changes in the future and to be considered as a stakeholder. If water quality concerns arise due to future mining activities or the abandoned coarse rejects, contact the WVDEP to determine the responsible party. The WVDEP may take action to regulate active mines and/or remediate sites if they have been forfeited by the previous owner/operator.	Utility Staff	Ongoing monitoring effort	Information on permit applications can be obtained through automated emails from the WVDEP Office of Mining and Reclamation. To request these notifications, visit: http://www.dep.wv.gov/dmr/Pages/default.aspx For more information on the public comment process and WVDEP program, concerned citizens can visit: http://www.dep.wv.gov/environmental-advocate/Documents/DEP2008CitizensGuide.pdf	Minimal cost associated with staff time.
Highway Traffic	Utility staff will participate in communications and incident drills with emergency responders to react quickly to any spills and initiate cleanup activities. In the event that contaminants do find their way into the public water supplies, the system will monitor and react according to standard operation procedures. Staff could also erect signs as described below.	Utility Staff	Ongoing effort	The utility could consider erecting signs as described below.	Minimal cost associated with staff time.

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
Impoundments and Sedimentation Ponds	In the event of a spill or break at the dam, the water utility staff would have enough time to react and close the intake until the threat has passed. The camp personnel have the contact information for the utility staff to alert them of any problems. The dam is inspected on a yearly basis to assess its condition.	Utility staff	Ongoing effort	-	Minimal cost association with staff time
Propane Storage and Future Site for Propane Sales	Become more familiar with the activities at the propane storage and sales facilities. Coordinate with company emergency preparedness personnel to ensure that they are aware of the water intake and what to do in case of an emergency, including notification so that the intake can be shut down to prevent contamination from being drawn into the treatment plant. Ask for copies of the facilities Materials Safety Data Sheets (MSDS) for the chemicals used/stored on site. The MSDS sheets are information sheets provided by the manufacture explaining how to deal with first aid, and spills of the chemical product. A facility should have a central location of these sheets and provide them if requested by the public or emergency responders.	Utility Staff	By 2019 Update	-	Minimal cost associated with staff time.
Inundation of Organic Materials and Water Quality Variation	The water system will consider installing Johnson's screen at the intake to possibly provide protection from the leaves, along with a hinged hatch door for access. The operators should also plan to produce water early on days when flood events are forecasted, so that the intake can be shut down until the leaves can be safely removed from the intake after flood waters have subsided.	Utility Staff	If funding becomes available for Johnson screens	To identify the source of the organic material, consider analyzing raw water samples during the period when unusually high chlorine feeds are required. Consult with WVDHHR SWAP staff or Environmental Engineering Division Philippi District Engineer, Craig Cobb, 304-457-2296 for suggestions on possible constituents that could cause an increased chlorine demand.	Johnson screens could be costly depending upon design.

PSSC or Critical Area	Management Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
Power line, pipeline, and highway rights-of-way	Contact the utilities and highway maintenance garage to determine the herbicides used within the rights-of-way and any other chemicals used. Herbicide labeling is developed with guidance from the USEPA providing information on application. This guidance has been developed with public health in mind and may list restrictions for application to prevent herbicide migration into water supplies. Communicate the boundaries of the SWPA to raise awareness with utility company to ensure BMPs.	Utility Staff	By 2019 Plan Update	-	Minimal cost associated with staff time.

10.0 EDUCATION AND OUTREACH STRATEGIES

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

Table 10. Education and Outreach Implementation Plan

Education and Outreach Strategy	Description of Activity	Responsible Protection Team Member	Status/ Schedule	Comments	Estimated Cost
Public Meeting	Cowen PSD held an informational meeting with local residents about source water protection efforts. The meeting was held to increase awareness of the connection between land use and drinking water quality. It was held during the regularly scheduled PSD board meeting. A Tetra Tech representative gave a presentation about the plan and was available to answer questions and take comments. Utility personnel were also present to answer questions. This meeting fulfilled a required part of the source water protection planning process.	Utility Staff, protection team	The meeting was held on 5/6/2016 at the Cowen PSD office.	The meeting was advertised for several weeks by posting an announcement flyer at the PSD office and around town. The flyer that was used to advertise the meeting is attached in **Appendix E. Supporting Documentation**. 10-15 people attended the meeting, and a scanned copy of the 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.	Cost in brochure printing and mailing
School Curricula	Work with the school system to incorporate source water activities into the school curricula.	Utility Staff	Yearly, as requested by local schools.	Operator will initiate effort, locate the appropriate individuals in school and/or on local school board. Can provide websites with free education materials to promote	Minimal costs. Would require time to

	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.			source water protection and conservation. Also operator may visit school or invite students for a plant tour to tie in with classroom materials.	coordinate, visit classroom and provide tour.
Plant Tours	Provide tours of the water plant to interested organizations such as watershed groups, schools, and civic organizations. Tours have been provided to local elementary schools in the past, and will be offered in the future as requested.	Operator	Regularly	Coordinate with local Emergency Responders to make them familiar with the facilities in the event of an emergency. Currently the responders are familiar with the layout of the facility, including where chlorine is kept and how to respond to a chlorine related incident.	Minimal cost associated with operator's time.
Drinking Water Protection Signs	Erecting Drinking Water Protection Signs along highways is a common awareness strategy in some states and recommended by the USEPA. Signs are placed to alert the public to the SWPA and about what to do in case of accidental spills.	Utility and City Staff	As needed	-	Cost associated with participation in activities.
Media Campaign	Work with local television stations to post source water and drinking water fact bulletins on public access television.	Utility Staff	Yearly	Information can be run at different times of the year (ex. focus on fertilizer contamination in spring/summer).	The ad for public access television should be free, so the cost would just be the time to prepare the information

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 Cowen PSD is provided in **Table 11**.

11.1 RESPONSE NETWORKS AND COMMUNICATION

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

Table 11. Cowen PSD Water Shortage Response Capability

Can the utility isolate or divert contamination from the intake or groundwater supply?	Yes
Describe the utility's capability to isolate or divert potential contaminants:	Cowen PSD has access to booms which can be used to protect the raw water intake from surface contamination.
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 utility does not have a fully reliable alternative source at this time. As a temporary solution, the

	operators at the treatment plant would run a temporary line up Upper Glade Creek to Camp Caesar Lake and pump directly from the lake down the hill to the plant. They are also looking at the feasibility of installing a secondary intake on the Williams River, and have contracted an engineering study to examine this alternative.
Can the utility close the water intake to prevent contamination from entering the water supply?	Yes
How long can the intake stay closed?	The intake could stay closed for roughly 2 days before the district would experience a significant water shortage.
Describe the process to close the intake:	The operators can manually close a shear gate to cut off the intake from the treatment plant.
Describe the treated water storage capacity of the water system:	Cowen PSD has 6 treated water storage tanks and 3 booster stations. Upper Glade Tank- 300,000 gal. Cowen Tank- 200,000 gal. Nursing Home Tank- 100,000 gal. Industrial Park Tank- 108,000 gal. Camden Tank- 125,000 gal. Bolair Tank- 100,000 gal. **Total- 933,000 gal. (Approximately 60 hours)** The utility does not have any raw water storage.
Is the utility a member of WVRWA Emergency Response Team?	The utility is not a member of the WV Rural Water Association Emergency Response Team, but is a member of WV Rural Water
Is the utility a member of WV-WARN?	Yes
List any other mutual aid agreements to provide or receive assistance in the event of an emergency:	Cowen PSD has informal assistance agreements with several nearby utilities such as Craigsville PSD, WV American Water in Webster Springs, and Birch River PSD. These utilities have loaned and received parts and assistance from Cowen PSD.

11.2 OPERATION DURING LOSS OF POWER

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

Table 12. Generator Capacity

<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="3">The utility has a 315 kVA (252 kW) generator at the treatment plant and a 16 kW generator they use to power their 3 booster pump stations during power outages.</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="3">No-The intake pumps are powered by the treatment plant so there is no need for a generator at the intake.</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="3">Yes- The utility owns a 315 kVA diesel generator that is kept on a flatbed trailer at the water treatment plant. It is not hard wired and requires an electrician to connect it to the facility, but this process does not take long.</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="3">Yes- The utility owns a portable 17.5 kW gas generator that they can transport between 3 of their 4 booster pump stations on a pickup truck and fill tanks as they get low. The pump stations all have quick-connects and do not require electrical work to connect to the generator. The fourth pump station cannot be connected to the generator.</td></tr>
<tr><td colspan="2">Does the utility have adequate fuel on hand for the generator?</td><td colspan="3">Yes. The trailer that hauls the 315 kVA generator also carries a 500 gal. diesel 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 colspan="2">Hours</td></tr>
<tr><td>500 gallons diesel</td><td colspan="2">48-60 hours</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 colspan="2">Phone Number</td></tr>
<tr><td>Generator</td><td>Sunbelt Rentals- St. Albans, WV</td><td colspan="2">304-766-6224,
pcm217@sunbeltrentals.com</td></tr>
<tr><td>Generator</td><td>Walker Caterpillar- Summersville, WV</td><td colspan="2">304-872-4303</td></tr>
<tr><td>Fuel</td><td>Adkins Oil- Craigsville, WV</td><td colspan="2">304-742-8971</td></tr>
<tr><td>Fuel</td><td>Local Nearby Coal Mines</td><td colspan="2">N/A</td></tr>
<tr><td colspan="2">Does the utility test the generator(s) periodically?</td><td colspan="3">The utility tests the generators monthly.</td></tr>
</table>

Does the utility routinely maintain the generator?	There is not a set maintenance schedule, but the treatment plant staff regularly maintains the generators.
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:	Cowen PSD is fairly self-sufficient in the event of a power outage and would not require additional assistance.

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. Cowen PSD has analyzed its ability to meet future water demands at current capacity, and this information is included in **Table 13**.

Table 13. Future Water Supply Needs for Cowen PSD

Is the utility able to meet water demands with the current production capacity over the next 5 years? If so, explain how you plan to do so.	Yes. The water treatment plant currently operates at around 70% of its capacity and they do not expect any significant changes in the customer base. The water system's opinions concerning the demand for the next five years are generally supported by population trends projected based on US Census Bureau 2000 and 2010 data. According to the 2005 Interim State Population Projections (1), WV as a whole will see a population decline between 2010 and 2030. In addition, researchers at the WVU College of Business and Economics specifically project that populations within Webster County will decrease from a population of 9,154 in 2010 to a projected population of 8,624 in 2020 (2). Census data and projections cannot account for increases in daily demand due to water line extensions. If, in the future, water line extension projects are proposed the daily demands will be reassessed to determine if the source and treatment facilities can support increased demand.
If not, describe the circumstances and plans to increase production capacity:	N/A

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

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

11.4 WATER LOSS CALCULATION

In any public water system there is a certain percentage of the total treated water that does not reach the customer. Some of this water is used in treatment plant processes such as back washing filters or flushing piping, but there is usually at least a small percentage that goes unaccounted for. To measure and report on this unaccounted for water, a public utility must use the method described in the Public Service Commission's rule, *Rules for the Government of Water Utilities*, 150CSR7, section 5.6. The rule defines unaccounted for water as

the volume of water introduced into the distribution system less all metered usage and all known non-metered usage which can be estimated with reasonable accuracy.

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

Table 14. Water Loss Information

Total Water Pumped (gal)		100,667,000
Total Water Purchased (gal)		0
Total Water Pumped and Purchased (gal)		100,667,000
Water Loss Accounted for Except Main Leaks (gal)	**Mains, Plants, Filters, Flushing, etc.**	2,380,000
	Fire Department	960,000
	Back Washing	0
	Blowing Settling Basins	0
Total Water Loss Accounted For Except Main Leaks		3,340,000
Water Sold- Total Gallons (gal)		64,182,000
Unaccounted For Lost Water (gal)		0
Water lost from main leaks (gal)		33,145,000
Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)		33,145,000
Total Percent Unaccounted For Water and Water Lost from Main Leaks (gal)		32.93%
If total percentage of Unaccounted for Water is greater than 15%, please describe any measures that could be taken to correct this problem:		The utility has recently replaced many old galvanized lines with newer line, and they replaced all meters in 2014. In addition, they have plans to replace more of the old line in the near future. They regularly find and fix any leaks as they arise.

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

11.5 EARLY WARNING MONITORING SYSTEM

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

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

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

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

Table 15. Early Warning Monitoring System Capabilities

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?	In the past, the utility has only received notices from local logging companies about any impacts they might be having on water quality on the Gauley River. Occasionally, they will also receive notices from local residents and emergency responders about automobile wrecks and spills.
Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?	Yes. WV Rt. 20 is the primary concern for the water treatment plant, as it is heavily travelled and runs parallel to the river for several miles upstream of the intake. The only industry upstream of the plant is timber and logging, which can cause sediment to enter the stream occasionally.
Are you prepared to detect potential contaminants if notified of a spill?	Yes. If they were notified of a spill, the utility staff would visually check the river and take grab samples to test for contaminants.

List laboratories (and contact information) on whom you would rely to analyze water samples in case of a reported spill.	**Laboratories**			
	Name	**Contact**		
	REIC Laboratory- Beaver, WV	800-999-0105, 304-255-2500, info@reiclabs.com		
	WV State Laboratory, Environmental Chemistry Section- Charleston, WV	304-965-2694		
	Analabs- Crab Orchard, WV	1-800-880-6406, analabs@analabsinc.com		
Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?	Yes-The operators have determined baseline water conditions through daily sampling in the plant and by monitoring the typical chemical feeds that are required to treat the water day to day.			
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?	No. See Form B in **Appendix B**.			
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	Approximate Capital Cost- $19,000	Approximate Capital Cost- $18,907	Approximate Capital Cost- $24,155
	Yearly O & M	Parts and calibration- Approximately $1,000 Data 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			

12.0 SINGLE SOURCE FEASIBILITY STUDY

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

To accomplish this requirement, utilities should examine all existing or possible alternatives and rank them by their technical, economic, and environmental feasibility. To have a consistent and complete method for ranking alternatives, WVBPH has developed a feasibility study guide. The guide provides several criteria to consider for each category, organized in a Feasibility Study Matrix. By completing the Feasibility Study Matrix, Cowen PSD 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

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

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

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

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

14.0 EMERGENCY RESPONSE SHORT FORM

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

15.0 CONCLUSION

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

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

APPENDIX A. FIGURES

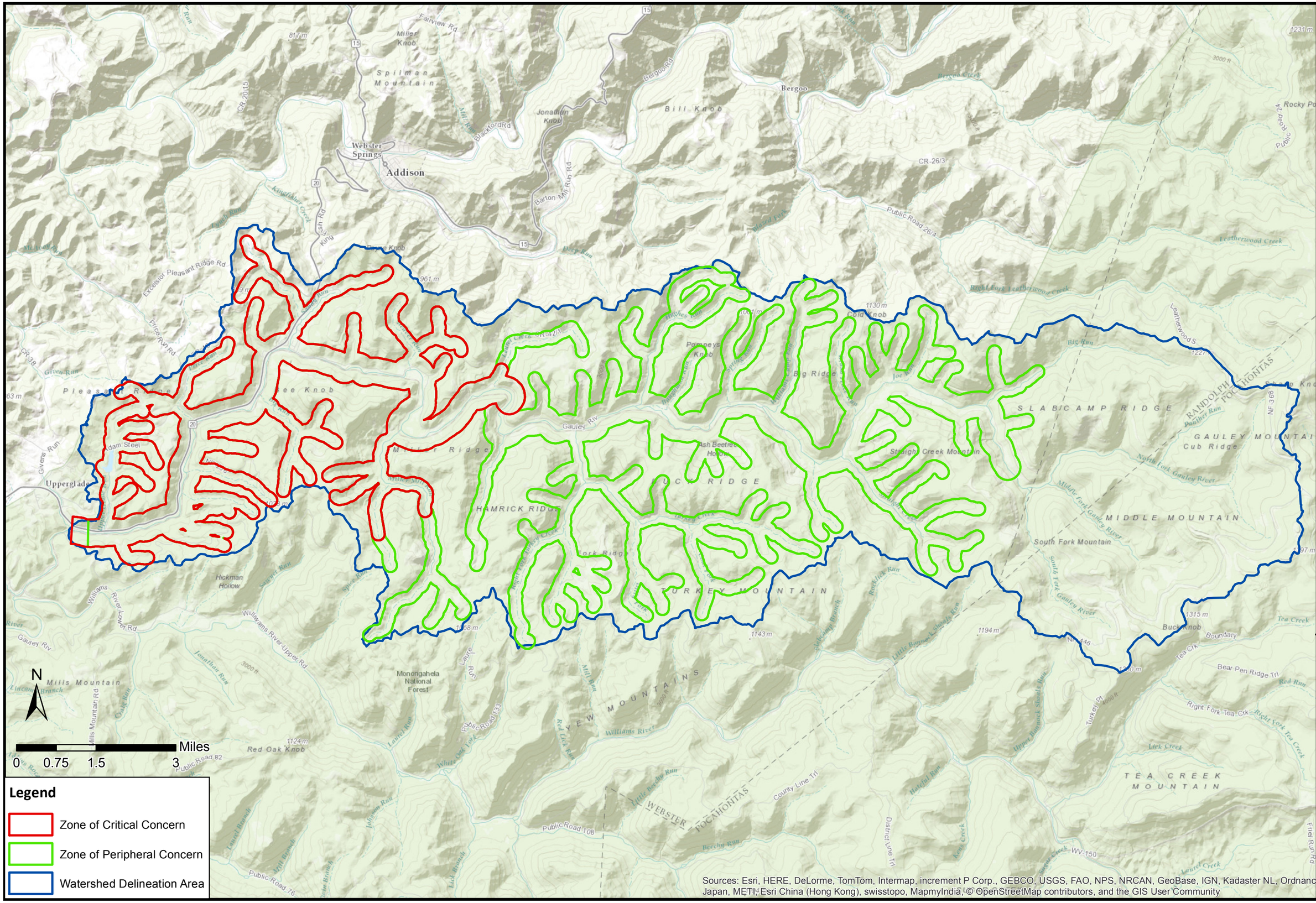


Figure A-1. Watershed Delineation Area, Zone of Critical Concern, and Zone of Peripheral Concern

CREATED BY: RWM

DATE: 1/18/16

Cowen Public Service District
PWSID: WV3305103
Source Water Protection Plan

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

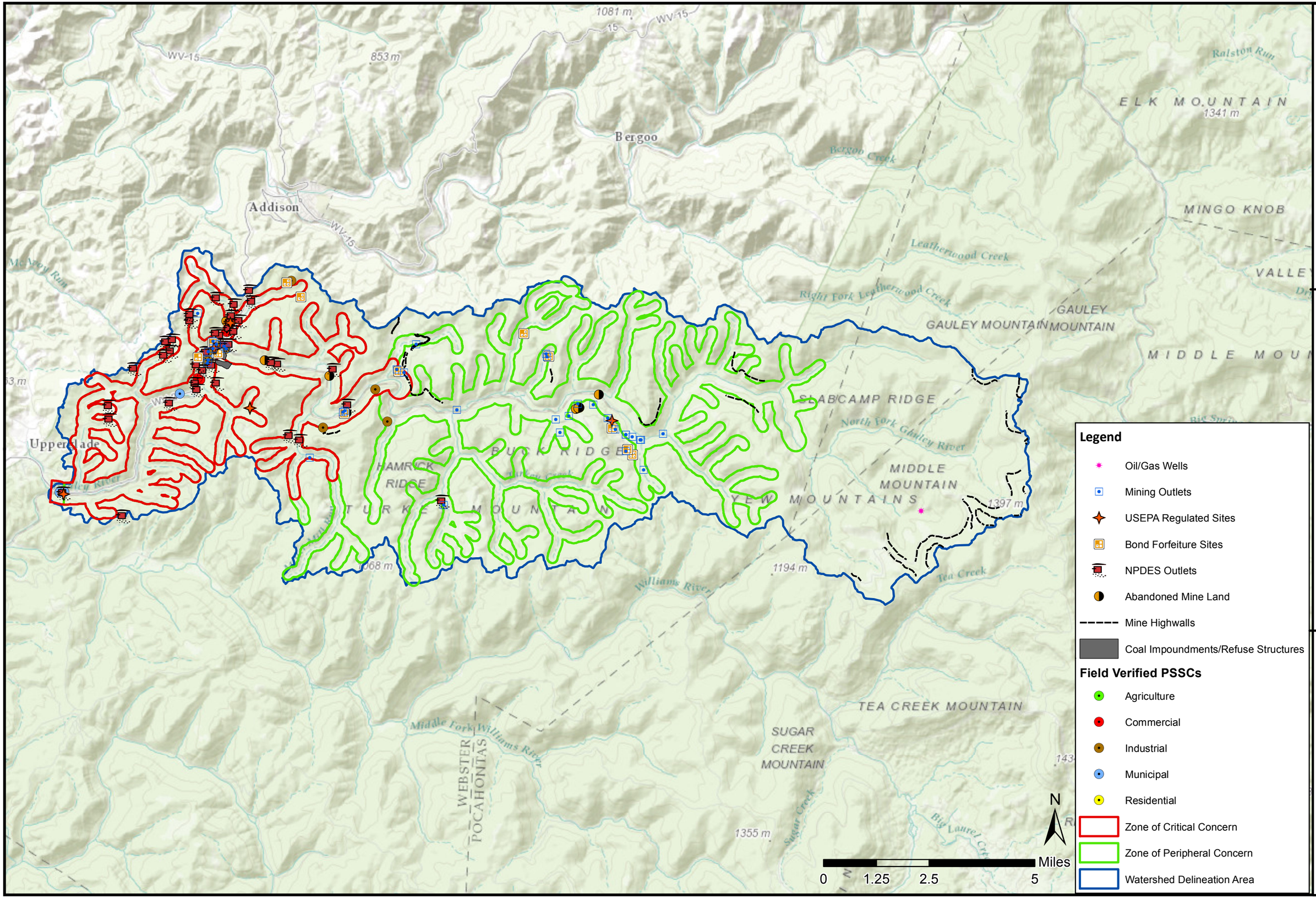


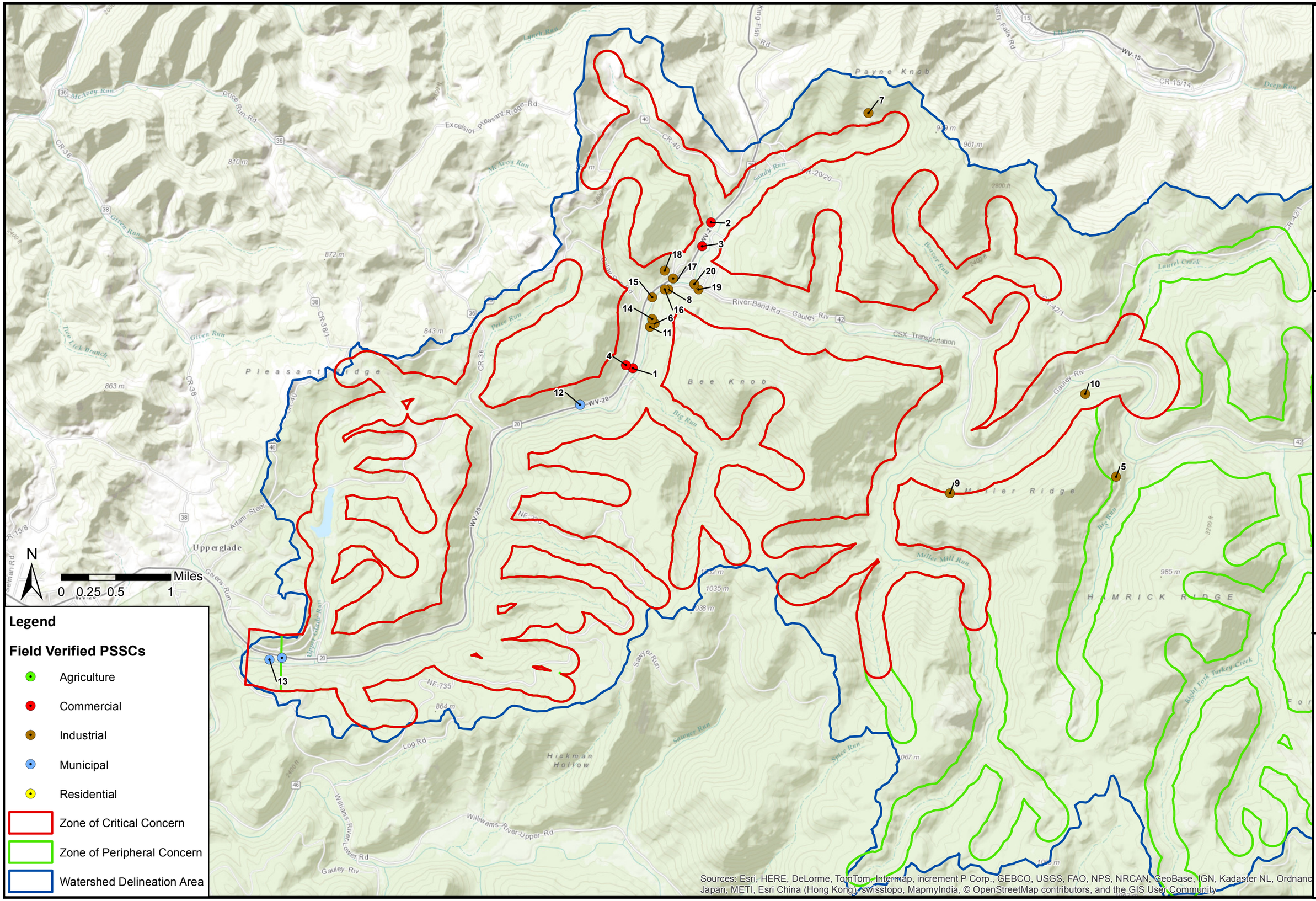
Figure A-2. Potential Sources of Significant Contamination

CREATED BY: RWM

DATE: 1/18/16

Cowen Public Service District
PWSID: WV3305103
Source Water Protection Plan

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



Legend

Field Verified PSSCs

- Agriculture
- Commercial
- Industrial
- Municipal
- Residential
- Zone of Critical Concern
- Zone of Peripheral Concern
- Watershed Delineation Area

Figure A-3. Field Verified PSSCs

DATE: 1/18/16

CREATED BY: RWM

Cowen Public Service District
PWSID: WV3305103
Source Water Protection Plan

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

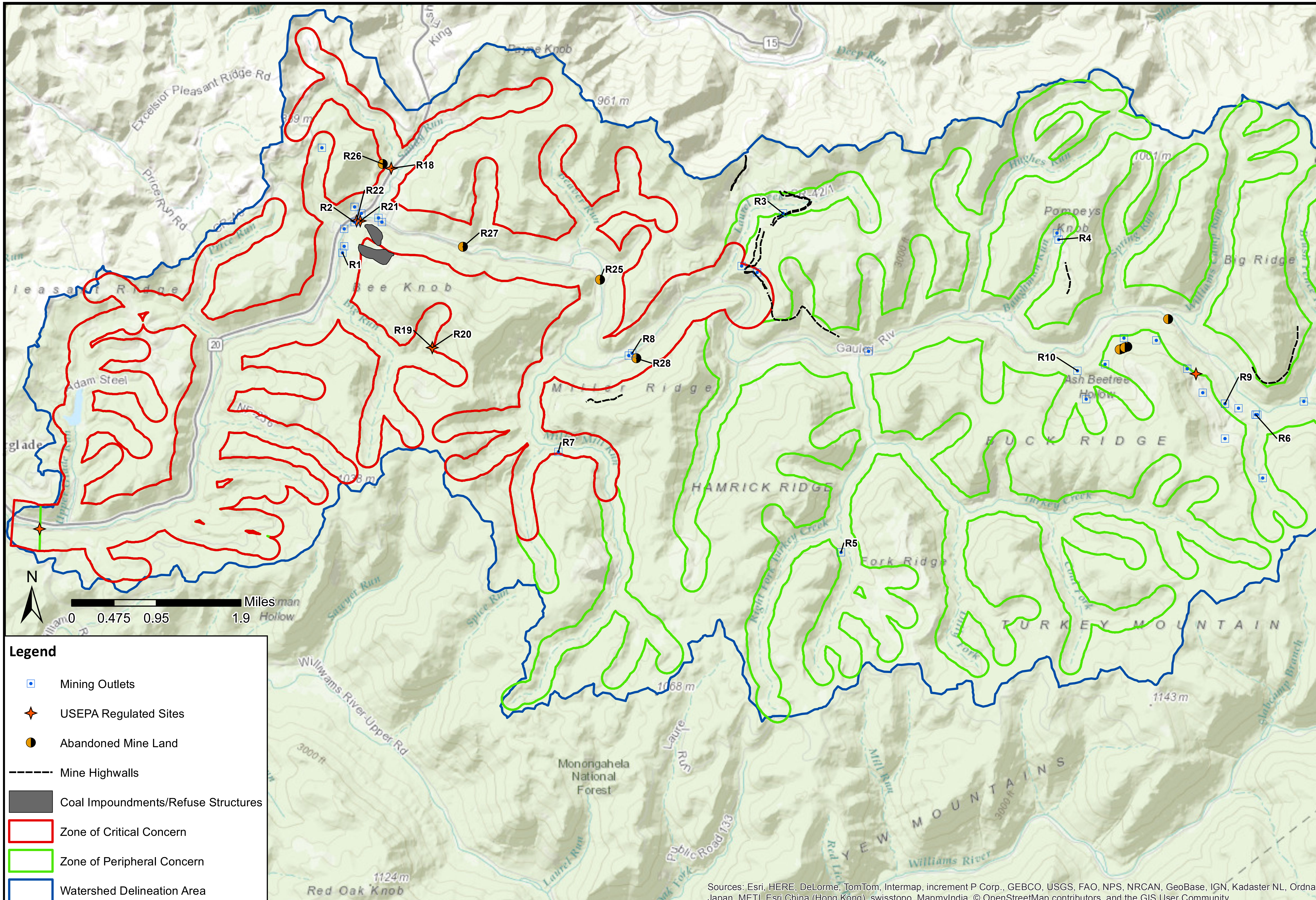


Figure A-4. Abandoned Mine Lands, Mining Outlets, USEPA Regulated Sites

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DATE: 1/18/16

Cowen Public Service District
PWSID: WV3305103
Source Water Protection Plan

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

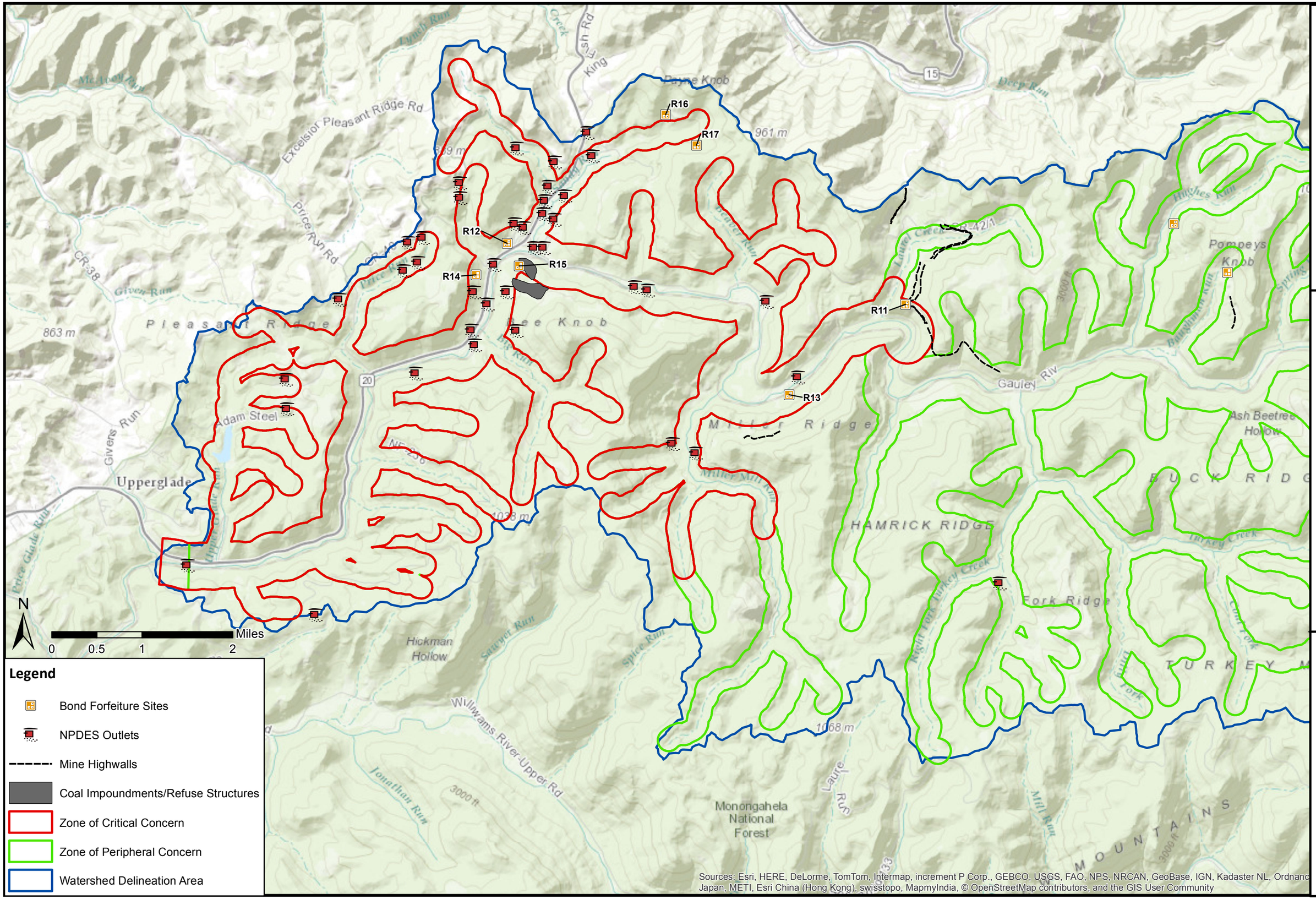


Figure A-5. NPDES Outlets and Bond Forfeiture Sites

CREATED BY: RWM

DATE: 1/18/16

Cowen Public Service District
PWSID: WV3305103
Source Water Protection Plan

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

Potential Sources of Significant Contamination

Cowen PSSC Count						
PSSC Layer	**In ZCC**	**Around ZCC**	**In ZPC**	**Around ZPC**	**In Watershed**	**Total Records**
Mining Outlets	14	0	16	6	0	**36**
NPDES Permits	27	11	1	0	0	**39**
Bond Forfeiture Sites	5	2	2	3	0	**12**
USEPA Regulated Sites	6	0	1	0	0	**7**
Field Verified PSSCs	18	2	1	0	0	**21**
Oil/Gas Wells	0	0	0	0	2	**2**
Abandoned Mine Lands	6	0	1	4	0	**11**
Coal Refuse Sites	2	0	0	0	0	**2**
Total	**78**	**15**	**22**	**13**	**2**	**130**

Cowen SWAP PSSCs – Figure A-3						
PSSC Number	**Map Code**	**Site Name**	**Site Description**	**Relative Risk Score**	**Survey Date**	**Comments**
1	C-1	Above Ground Storage Tanks	Propane tank storage lot	6.75	6/24/2010	none
2	C-10	Construction areas	site of future WVDOH regional headquarters and garage	3.48	12/3/2010	Location identified through regulatory database and confirmed by the operators.
3	C-23	Historic gas stations	Gas station is gone. Owner says site it clean. Planned use is propane sales.	3.00	6/24/2010	none
4		Junk yards, scrap and auto	Junk Yard - Closed	0.00	6/24/2010	none
5	I-23	Mines: abandoned	Reclaimed Coal Mine Lagoon 3	5.04	6/24/2010	PCS not surveyed, inaccessible
6	I-23	Mines: abandoned	Reclaimed Coal Mine Lagoon 1, removed	5.04	6/24/2010	PCS not surveyed, inaccessible

7	I-23	Mines: abandoned	Reclaimed Coal Mine Abandoned mine 2	5.04	6/24/2010	PCS not surveyed, inaccessible
8	I-23	Mines: abandoned	Reclaimed Coal Mine Abandoned mine 1	5.04	6/24/2010	PCS not surveyed, inaccessible
9	I-23	Mines: abandoned	Reclaimed Coal Mine Abandoned mine 3	5.04	6/24/2010	PCS not surveyed, inaccessible
10	I-23	Mines: abandoned	Reclaimed Coal Mine Lagoon 2	5.04	6/24/2010	PCS not surveyed, inaccessible
11	I-44	Other	SPRING RIDGE COAL COMPANY	0.00		
12	M-20	Road maintenance depots/deicing operations	WVDOH salt pile	3.08	12/3/2010	Location provided by operator.
13	M-29	Wastewater Treatment Plant	4-H Camp Caesar sewage treatment ponds adjacent to plant backwash pond	4.03	6/24/2010	none
	I-44	Other	SPRING RIDGE COAL COMPANY	0.00		
	I-44	Other	SPRING RIDGE COAL COMPANY	0.00		
	I-44	Other	SPRING RIDGE COAL COMPANY	0.00		
	I-44	Other	SPRING RIDGE COAL COMPANY	0.00		
	I-44	Other	SPRING RIDGE COAL COMPANY	0.00		
	I-44	Other	SPRING RIDGE COAL COMPANY	0.00		
	I-44	Other	SPRING RIDGE COAL COMPANY	0.00		

	M-5	Drinking Water Treatment Plants	Cowen PSD Drinking Water Treatment Plant	1.50	6/24/2010	none

* Only 13 SWAP PSSCs were prioritized and labeled in this analysis. Details on the other points are shown above and their locations are shown in A-4, but they are not labeled. Only one point for the Spring Ridge Coal Company was labeled and it represents the other 7 points in the same site.

HPU Mining Outlets Responsible Party Count	
Responsible Party	**Count**
C C CONLEY & SONS INC	17
DELTA COAL SALES, INC	2
DELTA MINING, INC	1
HOPE COAL CO	1
ISLAND CREEK COAL COMPANY	1
SPRING RIDGE COAL CO	14

Mining Outlets (HPU) – Figure A-5					
PSSC Number	**Regulation Type**	**Permit Number**	**Responsible Party**	**Type**	**In ZCC**
R1	HPU	WV0062618	SPRING RIDGE COAL CO	OUTLT	Yes
R2	HPU	WV0090671	SPRING RIDGE COAL CO	OUTLT	Yes
R3	HPU	WV0094757	SPRING RIDGE COAL CO	OUTLT	No
R4	HPU	WV0094862	SPRING RIDGE COAL CO	OUTLT	No
R5	HPU	WV0095133	HOPE COAL CO	OUTLT	No
R6	HPU	WV0098698	DELTA MINING, INC	OUTLT	No
R7	HPU	WV1000896	ISLAND CREEK COAL COMPANY	OUTLT	Yes
R8	HPU	WV1003062	DELTA COAL SALES, INC	OUTLT	Yes
R9	HPU	WV1011201	C C CONLEY & SONS INC	OUTLT	No
R10	HPU	WV1013661	C C CONLEY & SONS INC	OUTLT	No

*Only 10 prioritized HPU sites are labeled and shown. 26 more points lie within the WSDA but were not prioritized in this analysis.

Special Reclamation-Bond Forfeiture Sites (SPREC) – Figure A-6					
PSSC Number	**Regulation Type**	**Permit Number**	**Company**	**Mining Type**	**In ZCC**
R11	SPREC	U-2004-88	SPRING RIDGE COAL CO.	U	Yes
R12	SPREC	O-68-82	SPRING RIDGE COAL CO.	O	Yes
R13	SPREC	O-2024-86	DELTA COAL SALES, INC	O	Yes
R14	SPREC	U-138-83	SPRING RIDGE COAL CO.	U	Yes
R15	SPREC	R-722	SPRING RIDGE COAL CO.	R	Yes
R16	SPREC	70-81	WINDSOR PITTMAN COAL CO.	S	No
R17	SPREC	UO-648	WINDSOR PITTMAN COAL CO.	U	No

*Only 7 prioritized SPREC sites are labeled and shown. 5 more points lie within the WSDA but were not prioritized in this analysis.

USEPA Regulated Sites (Superfund_RCRA) – Figure A-5					
PSSC Number	**Regulation Type**	**Registry**	**Primary Site Name**	**Registry ID**	**In ZCC**
R18	Superfund_RCRA	110046000000	WEBSTER CO HEADQUARTERS ACCESS	110046133279	Yes
R19	Superfund_RCRA	110041000000	EVERGREEN MINING CO	110041478344	Yes
R20	Superfund_RCRA	110008000000	ICG EASTERN LLC BIRCH RIVER MINE	110007888198	Yes
R21	Superfund_RCRA	110055000000	SPRING RIDGE COAL CO; R-722, U	110054947224	Yes
R22	Superfund_RCRA	110046000000	RIVER BEND RD WATERLINE EXTENS	110045960082	Yes

*Only 5 prioritized USEPA Regulated sites are labeled and shown. 2 more points lie within the WSDA but were not prioritized in this analysis.

Abandoned Mine Lands (AML_Points) – Figure A-5				
PSSC Number	**Regulation Type**	**Pad Number**	**Pad Name**	**In ZCC**
R23	AML_Points	WV005166	BOLAIR (COGAR) V.O. & SUBSIDENCE	Yes
R24	AML_Points	WV006570	Bolair CR 42	Yes
R25	AML_Points	WV006190	GAULEY RIVER ROAD (BOLAIR) WATERLINE EXTENSION	Yes
R26	AML_Points	WV005172	BOLAIR (WEESE) PORTAL	Yes
R27	AML_Points	WV006190	GAULEY RIVER ROAD (BOLAIR) WATERLINE EXTENSION	Yes
R28	AML_Points	WV000966	MILLER RIDGE TIPPLE	Yes

*Only 6 prioritized AML sites are labeled and shown. 5 more points lie within the WSDA but were not prioritized in this analysis.

APPENDIX B. EARLY WARNING MONITORING SYSTEM FORMS

Form B- Proposed Early Warning Monitoring Systems

Cowen PSD

Primary Surface Water Source: Gauley River

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

The raw water intake for Cowen PSD extends from the water treatment plant into the Gauley River. The end of the pipe is located approximately 150' from the plant, so the following monitoring systems could likely be located in the plant or surrounding buildings.

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 Gauley 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. Since the Cowen PSD water treatment plant is so close to the intake, the Storm 3 could likely be located in the plant itself. If this was not possible and it needed to be located on the bank closer to the intake, the unit is contained in a waterproof case and comes with a solar photovoltaic panel capable of powering both the data analysis unit and the

sonde, so long as the sonde is hardwired to the Storm 3. The device can be battery powered as well if this is not an option.

What would the maintenance plan for the monitoring equipment entail?

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

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

Describe the proposed sampling plan at the monitoring site.

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

Describe the proposed procedures for data management and analysis.

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

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

B-2. Hach sc1000 Monitoring System Proposal

Describe the type of early warning detection equipment that could be installed, including the design.

The Hach sc1000 online monitoring system includes a controller, back panel, display module, and trough. The Cowen water treatment plant already has 2 Hach sc1000's to monitor water flowing from the filters. 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 could possibly be located in the plant itself. A small diameter line would run out from the plant the length of the intake pipe to pull raw water back to the controller where it would flow into the trough for sampling. The closer this sampling line can be to the actual intake, the more accurately it will reflect the raw water that is actually entering the plant. This option would require the utility to purchase a line or hose long enough to reach the intake pipe and a small pump. The line and pump could be fairly low- tech and inexpensive, as the sc1000 only requires a minimum of 900 mL/min. of flow. The controller will be equipped with the MODBUS advanced communications/networking unit, which can transmit readings in real time directly to the SCADA system in the treatment plant to alert the operators in any change in baseline water quality. The sc1000 can either be hardwired to the computer at the treatment plant or it can use a cellular modem to transmit the data if there is sufficient cellular signal.
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. Since they already have a service contract with Hach, the cost to add an additional unit could likely be reduced.
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?
In the case of Cowen PSD, the UV-VIS Full Monitoring System could potentially be located in the water treatment plant since it is so close to the raw water intake. A small-diameter line or hose would run from the treatment plant to the intake pipe to pull raw water back to the controller where it would flow into the unit for sampling. The closer the end of the sampling line can be to the actual intake, the more accurately it will reflect the raw water that is actually entering the plant. This option would require the utility to purchase enough line to reach the intake as well as a small pump. The line and pump could be fairly small and inexpensive, as the system only requires a minimum of 300-800 mL/min. of flow. The system also includes the Real Pump Clean System, which provides flow and automatic chemical cleaning of the sensors and reduces maintenance time. This system would require a reliable electrical source, but the intake is located adjacent to the treatment plant at Cowen, so electrical supply would not be an issue.
What would the maintenance plan for the monitoring equipment entail?
The maintenance plan for the system would require about 2 hrs/month for scheduled maintenance tasks. It is also recommended that a monthly laboratory reference sample is taken to effectively calibrate the sensors. The Smart-Sense Web Monitoring Service package costs an additional $499/yr., but provides additional support and remote accessibility by Real Tech, and it is recommended. The Deuterium and Tungsten lamps would also need to be replaced every six months at a cost of $740.
Describe the proposed sampling plan at the monitoring site.
The Full Scanning UV-VIS system continuously monitors raw water as it is pumped through the unit, and is capable of establishing baseline conditions that account for seasonal variability, which can help to reduce false alarms.
Describe the proposed procedures for data management and analysis.
The Real Tech monitoring system is capable of communicating with the treatment plant 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

Cowen PSD

PWSID: WV3305103

Administrative Contact: Terry Wayne

Contact Phone Number: 304-618-1604

Contact Email Address: cowenpsd@frontiernet.net

Plan Developed: May 2016

ACKNOWLEDGMENTS:

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

TABLE OF CONTENTS

INTRODUCTION

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

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

TIERS REPORTING SYSTEM

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

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

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

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

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

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

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

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

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

COMMUNICATION TEAM

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

Water system communication team members, organizations, and roles.

Team Member Name	Organization	Phone	Email	Role
Terry Wayne	Cowen PSD	304-618-1604	cowenpsd@frontiernet.net	Primary Spokesperson
Craig Ray	Cowen PSD	304-226-3541	-	Secondary Spokesperson
Lance Bragg	Cowen VFD	304-226-3191	cowenfire@yahoo.com	Member
Richard Rose	Webster County Emergency Services	304-847-2122	websteroes@citilink.net	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:

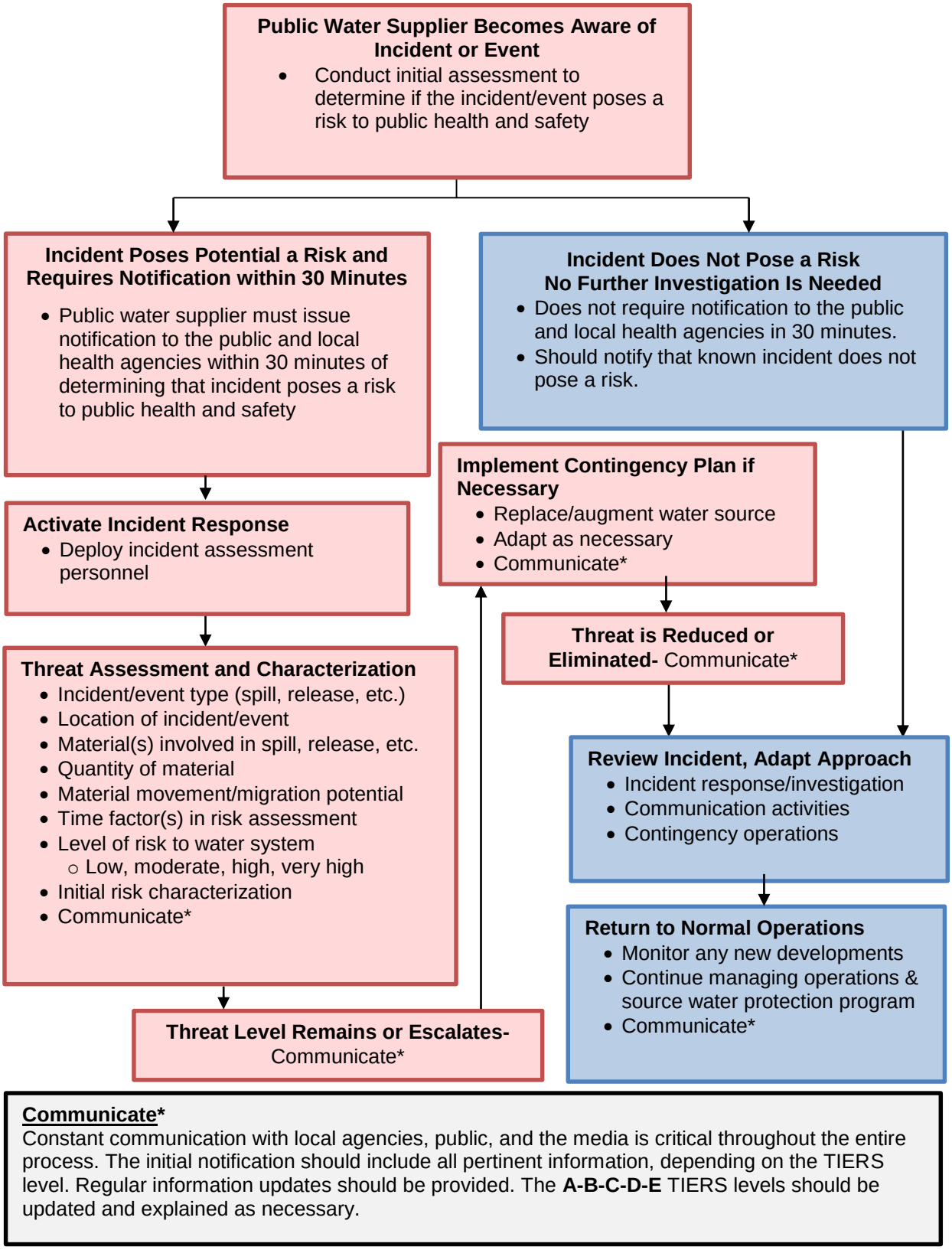
- Verification of the incident/event type (spill, release, etc.)
- Location of incident/event
- Type of material(s) involved in spill, release, etc.
- Quantity of material involved
- Potential of the material to move, migrate, or be transported
- Relevant time factor(s) in the risk assessment (e.g., 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, as well as 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:	Terry Wayne	304-618-1604	cowenpsd@frontiernet.net
Alternate spokesperson:	Craig Ray	304-226-3541	-
Designated location to disseminate information to media:	Cowen PSD Office		
Methods of contacting affected residents:	Webster County Emergency Management typically handles communication and coordination during any emergencies. They have an effective 911 communication network that uses, Social Media, and the Nicholas County Emergency Management website to contact affected residents. Cowen PSD also contacts affected residents about important information via local newspaper, posted notices, and local radio.		

	Name	Title	Phone Number	Email
Media contacts:	Summit Media Radio 97.1- Sutton, WV	Local Radio Station	304-764-7473 Summersville: 304-872-9797	al@summitmediawv.com
	SCTV Summersville	Summersville Television	304-872-1211	-
	WOAY	ABC Affiliate-Oak Hill, WV	304-469-3361	news@woay.com
	WCHS-TV8	ABC Affiliate-Charleston, WV	304-346-5358	news@wchstv.com

Emergency Services Contacts

	Name	Emergency Phone	Alternate Phone	Email
Local Police	Cowen Police Department	911	304-226-3101	-
Local Fire Department	Cowen Volunteer Fire Department	911	304-226-3191	-

Local Ambulance Service	Webster County EMS	911	304-226-3681	-
Hazardous Material Response Service	Cowen Volunteer Fire Department	911	304-226-3191	-

Sensitive Populations

Other communities that are served by the utility:	Bolair, Camden on Gauley		
Major user/sensitive population notification:	**Name**	**Emergency Phone**	**Alternate Phone**
	Webster Continuous Care Nursing Home	304-226-5301	-
	Glade Elementary	304-226-5353	-
	Webster County High School	304-226-5772	-
	Camp Caesar Lake	304-226-3888	-
	WV Baptist Camp	304-226-3522	-
	Webster Continuous Care Nursing Home	304-226-5301	-
EED District Office Contact:	**Name**	**Phone**	**Email**
	Craig Cobb	304-457-2296 EED Central Office 304-558-2981	craig.r.cobb@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**
	Craigsville PSD	Lundy Bailey	Treatment Plant 304-742-3585	Cell 304-651-5167
	City of Summersville	Robert Brown	304-872-3347	-

	Kanawha Falls PSD	Rick Wagner	Treatment Plant 304-779-2600	Cell 304-877-8761
	Armstrong PSD	Joe Burdett	Treatment Plant 304-442-5044	Don Navarro 304-442-5647
	WVAW-Montgomery District	Dave Peters	Treatment Plant 304-442-9728	304-340-2038
	Town of Pratt	-	304-442-8912	-
Are you planning on implementing the TIER system?		Yes		

Key Personnel

	Name	Title	Phone	Email
Key staff responsible for coordinating emergency response procedures?	Terry Wayne	Utility Manager	304-618-1604	cowenpsd@frontiernet.net
	Craig Ray	Chief Operator	304-226-3541	-
Staff responsible for keeping confidential PSSC information and releasing to emergency responders:	Terry Wayne	Utility Manager	304-618-1604	cowenpsd@frontiernet.net
	Craig Ray	Chief Operator	304-226-3541	-

Emergency Response Information

	Name	Phone
List laboratories available to perform sample analysis in case of emergency:	REIC Laboratory- Beaver, WV	800-999-0105, 304-255-2500, info@reiclabs.com
	WV State Laboratory, Environmental Chemistry Section- Charleston, WV	304-965-2694

	Analabs- Crab Orchard, WV	1-800-880-6406, analabs@analabsinc.com
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?	2014	

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
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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

Source Water Protection Plan

Contingency Plan and Alternative Analysis

COWEN PSD

PWSID WV3305103
WEBSTER COUNTY

SEPTEMBER 2015

Prepared by:

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In cooperation with Cowen Public Service District

TETRA TECH

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9/10/15
Date

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Background

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

Contingency Plan

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

Responding to Water Shortage or Contamination Event

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

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

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

Statewide initiatives for emergency response, including source water related incidents, are being developed. These include the West Virginia Water/Wastewater Agency Response Network (WV WARN, see http://www.wvwarn.org/) and the Rural Water Association Emergency Response Team (see http://www.wvrwa.org/). Cowen PSD has analyzed its ability to effectively respond to emergencies and this information is also provided in **Table 1**.

Table 1. Cowen PSD Water Shortage Response Capability

Can the utility isolate or divert contamination from the raw water intake?	Yes
Describe the utility's capability to isolate or divert potential contaminants:	Cowen PSD has access to booms which can be used to protect the raw water intake from surface contamination.
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 utility does not have a fully reliable alternative source at this time. As a temporary solution, the operators at the treatment plant would run a temporary line up Upper Glade Creek to Camp Caesar Lake and pump directly from the lake down the hill to the plant. They are also looking at the feasibility of installing a secondary intake on the Williams River, and have contracted an engineering study to examine this alternative.
Can the utility close the water intake to prevent contamination from entering the water supply?	Yes
How long can the intake stay closed?	The intake could stay closed for more than 2 days before the district would experience a water shortage.
Describe the process to close the intake:	The operators can manually close a shear gate to cut off the intake from the treatment plant.
Describe the raw and treated water storage capacity of the water system:	Cowen PSD has 6 treated water storage tanks and 3 booster stations. Upper Glade Tank- 300,000 gal. Cowen Tank- 200,000 gal. Nursing Home Tank- 100,000 gal. Industrial Park Tank- 108,000 gal. Camden Tank- 125,000 gal. Bolair Tank- 100,000 gal. **Total- 933,000 gal.** The utility does not have any raw water storage.

Is the utility a member of WVRWA Emergency Response Team?	The utility is not a member of the WV Rural Water Association Emergency Response Team, but is a member of WV Rural Water
Is the utility a member of WV-WARN?	Yes
List any other mutual aid agreements to provide or receive assistance in the event of an emergency:	Cowen PSD has informal assistance agreements with several nearby utilities such as Craigsville PSD, WV American Water in Webster Springs, and Birch River PSD. These utilities have loaned and received parts and assistance from Cowen PSD.

Operation During Loss of Power

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

Table 2. Generator Capacity

What is the type and capacity of the generator needed to operate during a loss of power?	The utility has a 315 kVA (252 kW) generator at the treatment plant and a 16 kW generator they use to power their 3 booster pump stations during power outages.
Can the utility connect to generator at intake/wellhead? If yes, select a scenario that best describes system.	No-The intake pumps are powered by the treatment plant so there is no need for a generator at the intake.
Can the utility connect to generator at treatment facility? If yes, select a scenario that best describes system.	Yes- The utility owns a 315 kVA diesel generator that is kept on a flatbed trailer at the water treatment plant. It is not hard wired and requires an electrician to connect it to the facility, but this process does not take long.
Can the utility connect to a generator in distribution system? If yes, select a scenario that best describes system.	Yes- The utility owns a portable 17.5 kW gas generator that they can transport between 3 of their 4 booster pump stations on a pickup truck and fill tanks as they get low. The pump stations all have quick-connects and do not require electrical work to connect to the generator. The fourth pump station cannot be connected to the generator.
Does the utility have adequate fuel on hand for the generator?	Yes. The trailer that hauls the 315 kVA generator also carries a 500 gal. diesel tank.

<table>
<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>500 gallons diesel</td><td>48-60 hours</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>Contact Information</td></tr>
<tr><td>Generator</td><td>Sunbelt Rentals- St. Albans, WV</td><td>(304) 766-6224, pcm217@sunbeltrentals.com</td></tr>
<tr><td>Generator</td><td>Walker Caterpillar- Summersville, WV</td><td>(304) 872-4303</td></tr>
<tr><td>Fuel</td><td>Adkins Oil- Craigsville, WV</td><td>(304) 742-8971</td></tr>
<tr><td>Fuel</td><td>Local Nearby Coal Mines</td><td>N/A</td></tr>
<tr><td colspan="2">Does the utility test the generator(s) periodically?</td><td colspan="2">The utility tests the generators monthly.</td></tr>
<tr><td colspan="2">Does the utility routinely maintain the generator?</td><td colspan="2">There is not a set maintenance schedule, but the treatment plant staff regularly maintains the generators.</td></tr>
<tr><td colspan="2">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:</td><td colspan="2">Cowen PSD is fairly self-sufficient in the event of a power outage and would not require additional assistance.</td></tr>
</table>

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. Cowen PSD has analyzed its ability to meet future water demands at current capacity, and this information is included in **Table 3**.

Table 3. Future Water Supply Needs for Cowen PSD

Is the utility able to meet water demands with the current production capacity over the next 5 years? If so, explain how you plan to do so.	Yes. The water treatment plant currently operates at around 70% of its capacity and they do not expect any significant changes in the customer base. The water system's opinions concerning the demand for the next five years are generally supported by population trends projected based on US Census Bureau 2000 and 2010 data. According to the 2005 Interim State Population

	Projections [1], WV as a whole will see a population decline between 2010 and 2030. In addition, researchers at the WVU College of Business and Economics specifically project that populations within Webster County will decrease from a population of 9,154 in 2010 to a projected population of 8,624 in 2020 [2]. Census data and projections cannot account for increases in daily demand due to water line extensions. If, in the future, water line extension projects are proposed the daily demands will be reassessed to determine if the source and treatment facilities can support increased demand.
If not, describe the circumstances and plans to increase production capacity:	N/A

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

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

Water Loss

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

Metered usages are most often those that are distributed to customers. Non-metered usages that are being estimated include uses such as by the fire departments for fires or training, un-metered bulk sells, flushing to maintain the distribution system, and water used for backwashing filters and cleaning settling basins. By totaling the metered and non-metered uses the utility 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 4** is taken from the most recently submitted Cowen PSD PSC Annual Report.

Table 4. Annual Water Loss Information*

Total Water Pumped (gal/year)		129,738,000
Total Water Purchased (gal)		0
Total Water Pumped and Purchased (gal)		129,738,000
Water Loss Accounted for Except Main Leaks (gal)	**Mains, Plants, Filters, Flushing, etc.**	1,800,000
	Fire Department	2,859,000
	Back Washing	247,000
	Blowing Settling Basins	0
Total Water Loss Accounted For Except Main Leaks		4,906,000
Water Sold- Total Gallons (gal)		74,369,000
Unaccounted For Lost Water (gal)		50,463,000
Water lost from main leaks (gal)		0
Total gallons of Unaccounted for Lost Water and Water Lost from Main Leaks (gal)		50,463,000
Total Percent Unaccounted For Water and Water Lost from Main Leaks (gal)		38.90%
If total percentage of Unaccounted for Water is greater than 15%, please describe any measures that could be taken to correct this problem:	The utility has recently replaced many old galvanized lines with newer line, and they replaced all meters in 2014. In addition, they have plans to replace more of the old line in the near future. They regularly find and fix any leaks as they arise.	

*From the 2014 Public Service Commission Annual Report

Early Warning Monitoring System

Public water utilities are required to provide an examination of the technical and economic feasibility of implementing an early warning monitoring system. Implementing an early warning monitoring system may be approached in different ways depending upon the water utility's resources and threats to the source water. A utility may install a continuous monitoring system that will provide real time information regarding water quality conditions. This would require utilities to analyze the data in order to establish what condition is

indicative of a contamination event. Continuous monitoring will provide results for a predetermined set of parameters. The more parameters being monitored, the more sophisticated the monitoring equipment will be. When establishing a continuous monitoring system, the utility should consider the logistics of placing and maintaining the equipment, and receiving output data from the equipment.

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

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

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

Table 5. Early Warning Monitoring System Capabilities

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?	In the past, the utility has only received notices from local logging companies about any impacts they might be having on water quality on the Gauley River. Occasionally, they will also receive notices from local residents and emergency responders about automobile wrecks and spills.
Are you aware of any facilities, land uses, or critical areas within your protection areas where chemical contaminants could be released or spilled?	Yes. WV Rt. 20 is the primary concern for the water treatment plant, as it is heavily travelled and runs parallel to the river for several miles upstream of the intake. The only industry upstream of the plant is timber and logging, which can cause sediment to enter the stream occasionally.
Are you prepared to detect potential contaminants if notified of a spill?	Yes. If they were notified of a spill, the utility staff would visually check the river and take grab samples to test for contaminants.

List laboratories (and contact information) on whom you would rely to analyze water samples in case of a reported spill.	**Laboratories**			
	Name	**Contact**		
	REIC Laboratory- Beaver, WV	800-999-0105, 304-255-2500, info@reiclabs.com		
	WV State Laboratory, Environmental Chemistry Section- Charleston, WV	304-965-2694		
	Analabs- Crab Orchard, WV	1-800-880-6406, analabs@analabsinc.com		
Do you have an understanding of baseline or normal conditions for your source water quality that accounts for seasonal fluctuations?	Yes			
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?	No- See Form B in **Appendix A**.			
Provide or estimate the capital and O&M costs for your proposed early warning monitoring system or upgraded system.	**Monitoring System**	**YSI EXO 2 (Table B-1)**	**Hach sc1000 (Table B-2)**	**Real Tech Full Scanning Monitoring System (Table B-3)**
	Capital	Total Capital Cost- $19,000	Approximate Capital Cost- $18,907	Approximate Capital Cost- $24,155
	Yearly O & M	Parts and calibration- Approximately $1,000 Data management and telemetry- $1,000	Full service contract with Hach Service Representative- $2,258. Cowen has an existing Hach monitors and service agreement, so may have cost savings. Online Viewer-$600	Replacement Lamps- $1,480 Smart-Sense Monitoring Service- $499
Do you serve more than 100,000 customers? If so, please describe the methods you use to monitor at the same technical levels utilized by ORSANCO.	No			

Single Source Feasibility Study

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

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

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

Appendix A. Early Warning Monitoring System

Form B- Proposed Early Warning Monitoring Systems

Cowen PSD

Primary Surface Water Source: Gauley River

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

The raw water intake for Cowen PSD extends from the water treatment plant into the Gauley River. The end of the pipe is located approximately 150' from the plant, so the following monitoring systems could likely be located in the plant or surrounding buildings.

Table B-1. YSI EXO 2 Monitoring System Proposal
Describe the type of early warning detection equipment that could be installed, including the design.
This plan uses the YSI EXO 2 Multiport Sonde, which can accommodate 6 different sensors and has an automatic wiper mechanism to remove biofouling from the sensor tips, which reduces maintenance time. The sonde is built to be resilient and low maintenance, and is capable of providing online water quality monitoring that can be transmitted real time to a designated PC or website that can be accessed by any designated user. The sonde can hold up to 6 sensors, but this plan recommends 4 of the more basic sensors that would be sufficient to detect any sudden shifts in water quality in 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 Gauley 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. Since the Cowen PSD water treatment plant is so close to the intake, the Storm 3 could likely be located in the plant itself. If this was not possible and it needed to be located on the bank closer to the intake, the unit is contained in a waterproof case and comes with a solar photovoltaic panel capable of powering both the data analysis unit and the sonde, so long as the sonde is hardwired to the Storm 3. The device can be battery powered as well if this is not an option.

What would the maintenance plan for the monitoring equipment entail?

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

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

Describe the proposed sampling plan at the monitoring site.

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

Describe the proposed procedures for data management and analysis.

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

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

Table B-2. Hach sc1000 Monitoring System Proposal
Describe the type of early warning detection equipment that could be installed, including the design.
The Hach sc1000 online monitoring system includes a controller, back panel, display module, and trough. The Cowen water treatment plant already has 2 Hach sc1000's to monitor water flowing from the filters. 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 could possibly be located in the plant itself. A small diameter line would run out from the plant the length of the intake pipe to pull raw water back to the controller where it would flow into the trough for sampling. The closer this sampling line can be to the actual intake, the more accurately it will reflect the raw water that is actually entering the plant. This option would require the utility to purchase a line or hose long enough to reach the intake pipe and a small pump. The line and pump could be fairly low- tech and inexpensive, as the sc1000 only requires a minimum of 900 mL/min. of flow. The controller will be equipped with the MODBUS advanced communications/networking unit, which can transmit readings in real time directly to the SCADA system in the treatment plant to alert the operators in any change in baseline water quality. The sc1000 can either be hardwired to the computer at the treatment plant or it can use a cellular modem to transmit the data if there is sufficient cellular signal.
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. Since they already have a service contract with Hach, the cost to add an additional unit could likely be reduced.
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.

Table B-3. Real Tech Full Scanning UV-VIS Monitoring System
Describe the type of early warning detection equipment that could be installed, including the design.
This plan utilizes the Real Tech Full Scanning UV-VIS monitoring system, which provides full ultraviolet/visible scanning for 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?
In the case of Cowen PSD, the UV-VIS Full Monitoring System could potentially be located in the water treatment plant since it is so close to the raw water intake. A small-diameter line or hose would run from the treatment plant to the intake pipe to pull raw water back to the controller where it would flow into the unit for sampling. The closer the end of the sampling line can be to the actual intake, the more accurately it will reflect the raw water that is actually entering the plant. This option would require the utility to purchase enough line to reach the intake as well as a small pump. The line and pump could be fairly small and inexpensive, as the system only requires a minimum of 300-800 mL/min. of flow. The system also includes the Real Pump Clean System, which provides flow and automatic chemical cleaning of the sensors and reduces maintenance time. This system would require a reliable electrical source, but the intake is located adjacent to the treatment plant at Cowen, so electrical supply would not be an issue.
What would the maintenance plan for the monitoring equipment entail?
The maintenance plan for the system would require about 2 hrs/month for scheduled maintenance tasks. It is also recommended that a monthly laboratory reference sample is taken to effectively calibrate the sensors.

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

Single Source Alternatives Feasibility Study

COWEN PSD

PWSID: WV3305103

TETRA TECH

PURPOSE

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

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

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

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

SYSTEM DESCRIPTION

The Cowen PSD provides water service to approximately 3,000 people. Located in Webster County, the PWS uses the Gauley River as its raw water supply. **Figure 1** presents the location of the PWS. The current capacity of the water treatment plant (WTP) is 0.600 MGD and the WTP uses pre-chlorination, coagulation sedimentation, filtration, disinfection and fluoridation to treat the water to potable standards. **Table 1** below provides a summary of the capacity and recent average day and maximum day demands in the Cowen system.

Table 1. Cowen PSD Capacity and Demands

Parameter	Value
2014 Average Day Demand (ADD) (MGD)	0.312
2014 Maximum Day Demand (MDD) (MGD)	0.596
WTP Capacity (MGD)	0.600
WTP Utilization	99.3%
MDD to ADD Ratio(1)	1.91

(1) Calculated by dividing the 2014 Maximum Daily Demand (MDD) by the 2014 Average Daily Demand (ADD)

Storage in the Cowen system uses ground storage tanks throughout the distribution system to equalize demands. **Table 2** provides a summary of the tanks.

Table 2. Cowen PSD Storage

Tank Name	Type	Volume (gallons)
Upper Glade	Ground	300,000
Cowen	Ground	200,000
Nursing Home	Ground	100,000
Industrial Park	Ground	108,000
Camden	Ground	125,000
Bolair	Ground	100,000
Total		933,000
2014 ADD (MGD)		0.355
Days Storage		2.63 days

The Cowen, Upper Glade, Industrial Park, and Bolair tanks are filled directly from the WTP. The Camden and Nursing Home are filled by booster pumps in the system. The Bolair tank was recently added to the system when Cowen took over the Bolair PWS. This tank is manually filled about 25,000-30,000 gal. each day. In general, the tanks are fully utilized and the PWS does not have a problem getting 20% turnover of volume (§64-77-9.4).

Interviews with Camden staff indicate that the tanks that fill directly from the WTP are the ones that will most likely run out of water first if the WTP is shut down. If the tanks were full when the WTP went off-line and non-essential water uses were limited, the PWS staff feels that water could be supplied for up to 3 days.

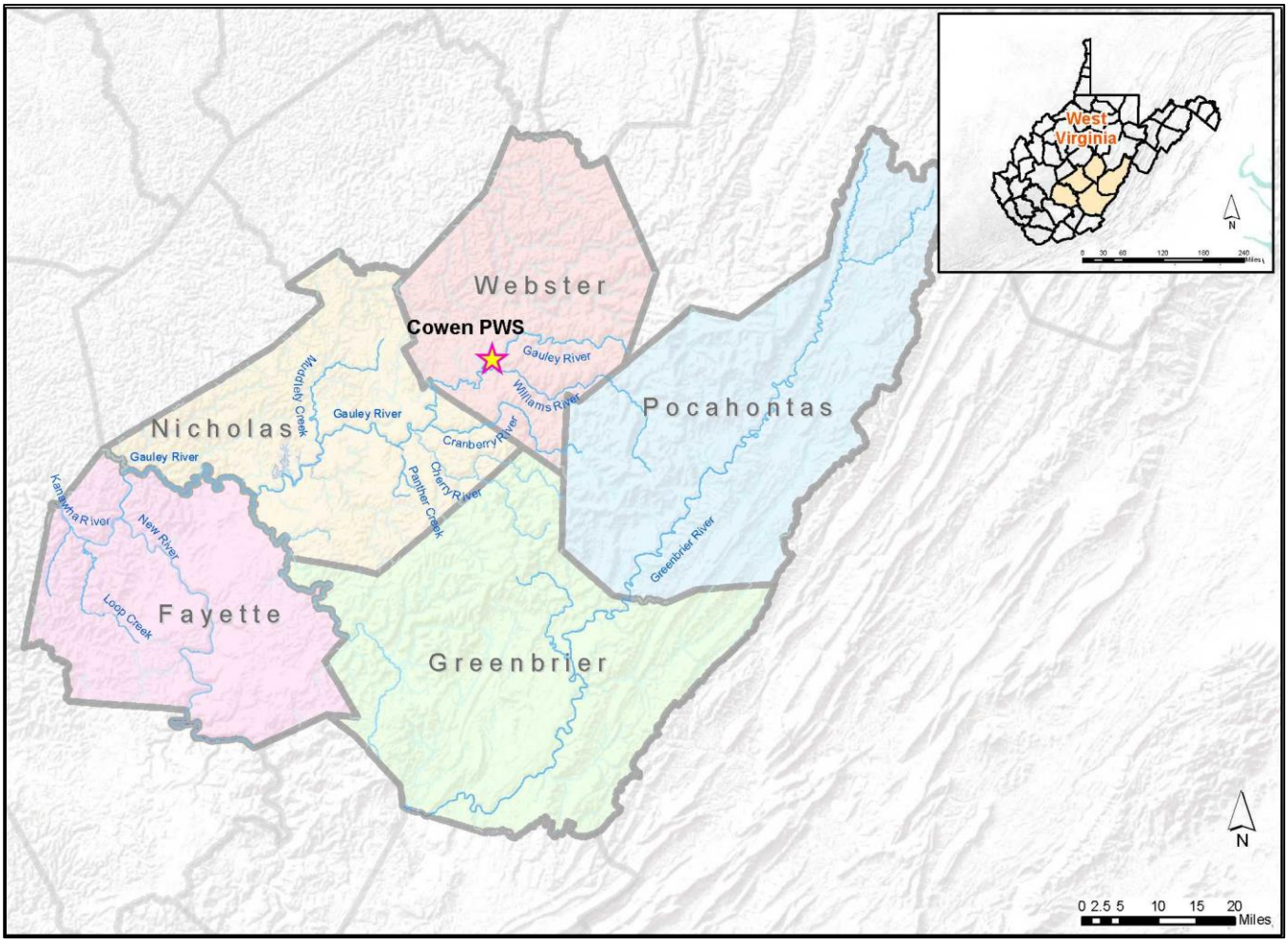

Figure 1. Cowen PSD Location Map

ALTERNATIVES

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

Table 3. Alternatives – Sizing Basis

Alternative	Backup Intake	Raw Storage	Treated Storage	Interconnect
Basis	Max. day	2 days of max. day demand	2 days of max. day demand	Average day
Value	0.6 MGD	1.2 MGD	1.2 MGD	0.314 MGD(1)

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

Cost estimates were developed based on a conceptual analysis of each alternative. All costs were reviewed for accuracy and compared with actual costs of similar projects and RSMeans CostWorks 2014. The estimates include materials, installation and contractor's overhead and profit. The estimates are also based on the following assumptions and considerations:

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

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

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

Backup Intake

Cowen is already in the planning stages of constructing a backup intake on the Williams River. The supply line would run down a railroad grade to a point on the Williams River that is not influenced by the Gauley. The proposed intake site is at the location of an old mill so there would be little impact on the surroundings; however, the site is also near the Cranberry Wildlife Management Area. The proposed location is in the 100 year flood plain so additional site improvements may be required. The proposed route would require approximately 10,000 feet of 8-inch pipe.

Raw Water Storage

The raw water storage alternative includes installing a 1.5 MG (1.2 MG usable volume) steel ground storage tank on property adjacent to the WTP site. This would require increasing the size of the pumps at the intake structure to fill the tank and installing an additional set of pumps to transfer raw water from the tank to the WTP. The site is located within the 100 year flood plain so site improvements to compensate flood storage volume would be required.

Treated Water Storage

Like the raw water storage alternative, this tank would be located adjacent to the WTP and would have a similar size and configuration without requiring modifications to the intake pumps. Providing treated water storage over and above the required two days ADD presents some operational challenges for the PWS in meeting the 20% daily turnover requirement. With full tanks, the PWS will be faced with having to drain water during periods of low demand to meet the turnover requirement which will increase the non-revenue water for the system.

Interconnection

Cowen is at the highest elevation of all of the surrounding water systems. Of the water systems within a ten mile radius of Cowen, Camden on Gauley, Craigsville and Webster Springs are the most likely candidates for an interconnect. Camden on Gauley currently receives its water from Cowen so it has no capacity to contribute. Supplying Cowen from Webster Springs would require significant pumping to overcome the elevation change. Craigsville also has a significant elevation change but less than Webster Springs and is considered for this analysis.

FEASIBILITY DETERMINATION

The attached matrix and sub-schedules (**Tables 4, 5, 6, and 7**) present the feasibility rankings of the alternatives.

The Craigsville interconnection is not considered a very feasible alternative due primarily to its high capital cost and because it shares a common source water with Cowen, which means it may also be affected by a contamination event on the Gauley River.

Treated water storage is a possible alternative but the cost and potential operational issues associated with having to maintain a 20% turnover in volume reduces its desirability.

Raw water storage ranks slightly more feasible than treated water with capital cost being the largest factor affecting feasibility.

A backup intake on the Williams River is the least costly alternative and is currently being considered by Cowen PSD to meet its needs. Therefore, this alternative is considered the most feasible.

Table 4. Feasibility Matrix

Water Management Strategy Description	Economic Criteria					Technical Criteria							Environmental Criteria						Final Score	Capital Cost	Comments
	45%					45%							10%						100%		
	Operation and Maintenance Costs	Capital Costs	**Total**	**Total %**	**Weighted Total**	Permitting	Flexibility	Resilience	Institutional Requirements	**Total**	**Total %**	**Weighted Total**	Environmental Impacts	Aesthetic Impacts	Stakeholder Issues	**Total**	**Total %**	**Weighted Total**			
Backup Intake	3.0	2.0	**5.0**	**83.3%**	**37.5%**	2.0	3.0	2.7	2.3	**10.0**	**83.3%**	**37.5%**	1.0	3.0	2.0	**6.0**	**66.7%**	**6.7%**	**81.7%**	**$2,310,000**	Cowen is in the planning phase for an intake on the Williams River.
Interconnect	3.0	1.0	**4.0**	**66.7%**	**30.0%**	2.2	1.0	2.7	2.3	**8.2**	**68.3%**	**30.8%**	3.0	3.0	2.0	**8.0**	**88.9%**	**8.9%**	**69.6%**	**$2,807,490**	Craigsville also pulls from the Gauley River and will likely be affected during a contamination event
Treated Water Storage	3.0	1.0	**4.0**	**66.7%**	**30.0%**	1.6	1.5	2.3	2.3	**7.8**	**64.7%**	**29.1%**	3.0	2.5	2.0	**7.5**	**83.3%**	**8.3%**	**67.5%**	**$3,650,500**	Tank would be located at WTP site and tie to the high service pumps.
Raw Water Storage	3.0	1.0	**4.0**	**66.7%**	**30.0%**	2.4	3.0	2.3	2.3	**10.1**	**83.9%**	**37.8%**	3.0	2.5	2.3	**7.8**	**87.0%**	**8.7%**	**76.5%**	**$3,650,500**	Tank would be located at WTP site and tie in between the intake structure and WTP.

Table 5. Alternatives Table

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility
Economic Criteria									
What is the total current budget year cost to operate and maintain the PWSU (current budget year)?		$412,934.00		$412,934.00		$412,934.00		$412,934.00	
O and M Costs	Describe the major O&M cost requirements for the alternative?	Electricity for pumping; maintenance	3	Labor and materials to maintain pumps	3	Electricity for transfer pumps, labor, maintenance; does not included water flushed	3	Electricity for transfer pumps, labor, recurring maintenance	3
	What is the incremental cost ($/gal) to operate and maintain the alternative?	$11,537.00	3	$2,964.00	3	$9,652.00	3	$11,252.00	3
	Cost comparison of the incremental O&M cost to the current budgeted costs (%).	2.79%	3	0.72%	3	2.34%	3	2.34%	3
O and M-Feasibility Score			***3.0***		***3.0***		***3.0***		***3.0***
Describe the capital improvements required to implement the alternative.		Intake structure and pump station; 10,000 ft. of 8" diameter pipe		36,000 ft. of piping and pump station for supply to Cowen		1.5 MG ground storage tank and transfer pumps		1.5 MG Ground storage tank and transfer pumps	
Capital Costs	What is the total capital cost for the alternative?	$2,310,000	2	$2,807,490	1	$3,650,500	1	$3,650,500	1
	What is the annualized capital cost to implement the alternative, including land and easement costs, convenience tap fees, etc. ($/gal)	$148,000.00	2	$181,000.00	1	$201,000.00	1	$201,000.00	1
	Cost comparison of the alternatives annualized capital cost to the current budgeted costs (%).	36.08%	2	43.83%	1	48.68%	1	48.68%	1
Capital Cost-Feasibility Score			***2.0***		***1.0***		***1.0***		***1.0***

Table 5. Alternatives Table (Cont'd)

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility
Technical Criteria									
Permitting	Provide a listing of the expected permits required and the permitting agencies involved in their approval.	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2
	What is the timeframe for permit approval for each permit?	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2
	Describe the major requirements in obtaining the permits (environmental impact studies, public hearings, etc.).	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2	See Permitting Sub-schedule	2
	What is the likelihood of successfully obtaining the permits?	Potential T&T species issues	1	No identified barriers	2	Potential for nonrevenue water issues	1	No identified barriers	3
	Does the implementation of the alternative require regulatory exceptions or variances?	None identified	3	None identified	3	In order to avoid flushing water additional studies may be required to support a variance from the 20% turnover rule	1	None Identified	3
Permitting-Feasibility Score			***2.0***		***2.2***		***1.6***		***2.4***
Flexibility	Will the alternative be needed on a regular basis or only used intermittently?	Intermittent	3	Intermittent; operations will be difficult due to overcoming such a large elevation difference.	1	Full time operations	2	Full time operations; with ability for intermittent	3
	How will implementing the alternative affect the PWSU's current method of treating and delivering potable water including meeting Safe Drinking Water Act regulations? (ex. In the case of storage, will the alternative increase the likelihood of disinfection byproducts?)	No changes in treatment or water delivery with the backup source	3	May not provide protection in a contamination event	1	With the requirement to turn over 20% of tank volume the system will be required to flush water during days when demands are low.	1	There will be additional operating requirements for the new equipment but the existing treatment process will be minimally affected.	3
Flexibility-Feasibility Score			***3.0***		***1.0***		***1.5***		***3.0***

Table 5. Alternatives Table (Cont'd)

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility
Resilience	Will the alternative provide any advantages or disadvantages to meeting seasonal changes in demand?	Yes, there will be an additional source to draw from during periods of low flow	3	Yes. Interconnect will provide back up in other emergency situations	3	Yes; only short term	2	Yes; only short term	2
	How resistant will the alternative be to extreme weather conditions such as drought and flooding?	Will provide an additional source of supply.	2	No benefit	2	Yes; only short term	2	Yes; only short term	2
	Will the alternative be expandable to meet the growing needs of the service area?	Yes	3	Yes	3	Yes	3	Yes	3
Resilience-Feasibility Score			***2.7***		***2.7***		***2.3***		***2.3***
Institutional Requirements	Identify any agreements or other legal instruments with governmental entities, private institutions or other PWSU required to implement the alternative.	None identified	3	Emergency Usage agreement with Craigsville	2	None identified	3	None Identified	3
	Are any development/planning restrictions in place that can act as a barrier to the implementation of the alternative?	Possible historic Native American sites in the Cowen area	2	None identified	3	Possible historic Native American sites in the Cowen area	2	Possible historic Native American sites in the Cowen area.	2
	Identify potential land acquisitions and easements requirements.	Easement and/or property purchase for intake and pump stations	2	Easement and/or property purchase for pumps.	2	The tank site would need to be acquired from its current owner	2	The tank site would need to be acquired from its current owner.	2
Institutional Requirements-Feasibility Score			***2.3***		***2.3***		***2.3***		***2.3***
Environmental Criteria									
Environmental Impacts	Identify any environmentally protected areas or habitats that might be impacted by the alternative.	Intake structure and pipe route are likely to require surveys for T&E species	1	None identified	3	None identified	3	None Identified	3
Environmental Impacts-Feasibility Score			***1.0***		***3.0***		***3.0***		***3.0***

Table 5. Alternatives Table (Cont'd)

Criteria	Question	Backup Intake	Feasibility	Interconnect	Feasibility	Treated Water Storage	Feasibility	Raw Water Storage	Feasibility
Aesthetic Impacts	Identify any visual or noise issues caused by the alternative that may affect local land uses?	None identified	3	None identified	3	The storage tank would be a large structure in an area with few comparably sized structures	2	The storage tank would be a large structure in an area with few comparably sized structures	2
	Identify any mitigation measures that will be required to address aesthetic impacts?	None identified	3	None identified	3	None identified	3	None identified	3
Aesthetic Impacts-Feasibility Score			***3.0***		***3.0***		***2.5***		***2.5***
Stakeholder Issues	Identify the potential stakeholders affected by the alternative.	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2
	Identify the potential issues with stakeholders for and against the alternative.	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2	See Stakeholder Sub-schedule	2
	Will stakeholder concerns represent a significant barrier to implementation (or assistance) of the alternative?	Possibly from an environmental perspective	2	No	2	No	2	No	3
Stakeholder Issues-Feasibility Score			**2.0**		**2.0**		**2.0**		**2.3**
Comments		Cowen is in the planning phase for an intake on the Williams River.		Craigsville also pulls from the Gauley River and will likely be affected during a contamination event.		Tank would be located at WTP site and tie to the high service pumps.		Tank would be located at WTP site and tie in between the intake structure and WTP	

Table 6. Permitting Sub-Schedule

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

(1) US Army Corps of Engineers

Application Period Duration							
Agency	Permit	Back up Intake	Interconnect	Raw Water Storage	Treated Water Storage	Other	Notes
WV Bureau Public Health	Construction	90 days	90 days	90 days	90 days		
USACOE	404 Permit	180 days	NA	NA	NA		
Local/State Road Agency	ROW Utilization	90 days	90 days	NA	NA		
Historical Preservation Office		Unknown; estimate less than a year for impact determination		Unknown; estimate less than a year for impact determination	Unknown; estimate less than a year for impact determination		

Application Requirements							
Agency	Permit	Back up Intake	Interconnect	Raw Water Storage	Treated Water Storage	Other	Notes
WV Bureau Public Health	Construction	Engineers Report; Construction Drawings; Specifications	Engineers Report; Construction Drawings; Specifications	Engineers Report; Construction Drawings; Specifications	Engineers Report; Construction Drawings; Specifications		
USACOE	404 Permit	Construction Drawings; Construction Plan	NA	NA	NA		
Local/State Road Agency	ROW Utilization	Construction Drawings	Construction Drawings	NA	NA		
Historical Preservation Office		Unknown; estimate less than a year for impact determination		Unknown; estimate less than a year for impact determination	Unknown; estimate less than a year for impact determination		

Table 6. Permitting Sub-Schedule (Cont'd)

Other Considerations							
Agency	Permit	Back up Intake	Interconnect	Raw Water Storage	Treated Water Storage	Other	Notes
WV Bureau Public Health	Construction	Additional requirements due to site being located within the 100 year flood plain		Additional requirements due to site being located within the 100 year flood plain	Additional requirements due to site being located within the 100 year flood plain		
USACOE	404 Permit						
Local/State Road Agency	ROW Utilization	Pipe route is located on an old railroad grade.					
Historical Preservation Office			Pipe route will mostly follow road ROW				

Table 7. Stakeholders Sub-Schedule

List concerns for each alternative by stakeholder					
Stakeholder Group	**Back up Intake**	**Interconnect**	**Raw Water Storage**	**Treated Water Storage**	**Notes**
Residential Customers	Cost impacts; Improved protection from contamination	Cost impacts; Improved protection from contamination	Aesthetic concerns; Cost impacts; Improved protection from contamination	Aesthetic concerns; Cost impacts; Improved protection from contamination	Neutral response
System Owner	Additional operations; Cost impacts; Currently selected alternative	Additional operations; Cost impacts	Additional operations; Cost impacts	Operational issue with storage turnover; Cost impacts	Positive for back up intake; Positive to meet regulations and improve service; Negative for treated water storage
Industrial/Commercial Customers	Cost impacts; Improved service and protection from contamination	Cost impacts; Improved service and protection from contamination	Cost impacts; Improved service and protection from contamination	Cost impacts; Improved service and protection from contamination	Neutral to positive response; less sensitive to costs over improved service
Environmental Interest Groups	Concerns about an intake in the Williams River next to the Cranberry Wildlife Management Area	Minor	Minor	Minor	Average to negative response
Historic Preservation Groups	Concerns about impact to historic Native American sites near Cowen	Concerns about impact to historic Native American sites near Cowen	Concerns about impact to historic Native American sites near Cowen	Concerns about impact to historic Native American sites near Cowen	Average to negative response

CONCLUSIONS

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

1. The existing storage in Cowen is slightly above the 2 day minimum requirement. Based on conversations with the Cowen PWS staff, if the tanks are full when the WTP is brought off-line there could be as much as 3 days of supply with significantly reduced usage by the customer base.

2. An intake on the Williams River is considered the most feasible alternative (Figure 2). Since Cowen is in the planning stages of implementing this alternative, no further alternative analysis is necessary for this feasibility study. **Table 8** presents an opinion of costs for the backup intake, which is derived from preliminary information and assumptions of certain costs. The opinion of costs is provided solely to compare alternative feasibility. Refined cost estimates generated by project engineers based on detailed analysis may differ and should prevail for financial planning purposes.

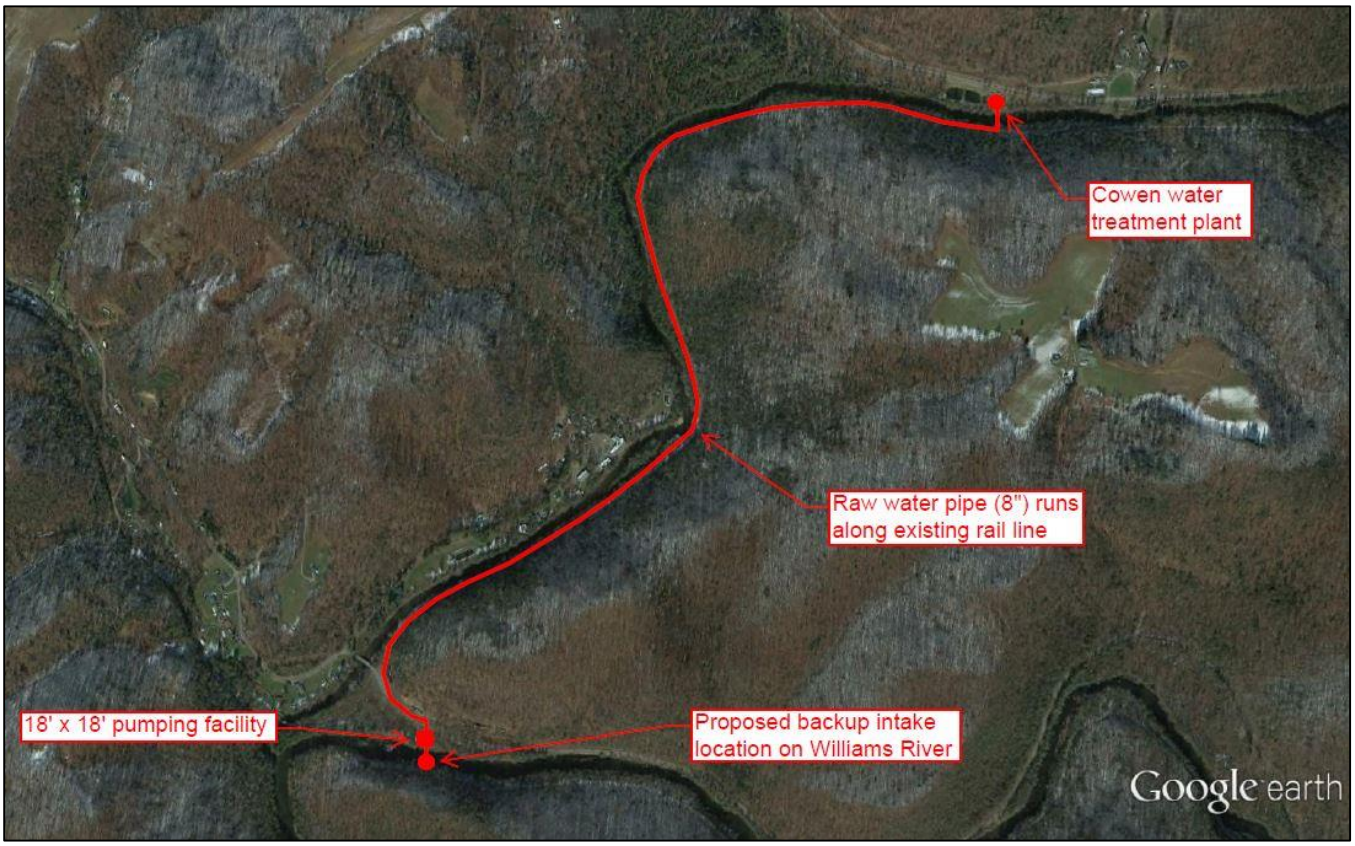

Figure 2. Cowen PSD Backup Intake Conceptual Drawing

Table 8. Backup Intake – Opinion of Cost

Facility Description/Capital Cost				
Item	**Quantity**	**Unit**	**Unit Cost**	**Total Cost**
Intake Screen 8"	1	EA	$2,000	$2,000
Flow control/Sluice gate	1	EA	$20,000	$20,000
Intake Piping - 8" RCP	150	FT	$137	$20,550
Piping to plant - 8" DIP	10,111	FT	$61	$616,771
Raw Water Intake Pumps	3	EA	$120,000	$360,000
Pre-Cast Vault for raw water pump station	1	EA	$100,000	$100,000
Electrical & Controls	1	EA	10% PS costs	$46,000
			Subtotal	**$1,165,321.00**
			Contingency @ 30%	$349,596.30
			Eng. Permit, etc. @ 15%	$174,798.15
			Land Acquisition and Easements	$619,784.21
	Total Backup Intake Capital Costs			**$2,309,499.66**

APPENDIX E. SUPPORTING DOCUMENTATION

E-1. Protection Team Meeting

Date: 4/12/2016

Location: Cowen PSD Office, Cowen, WV

Participants: General Manager Terry Wayne, Joseph Garland, Rick Shaver, Steve Wayne, Richard Rose, Lance Bragg, and Tetra Tech Representative Russell Myers

- On Tuesday April 12, 2016, the Source Water Protection Team for Cowen PSD met to review and update the draft of the SWPP. This was the third meeting between TT staff and utility personnel. The first two meetings were arranged to discuss the Contingency and Feasibility Study, as well as the SWPP. All required members of the team were present, with the exception of a utility board member. The PSD board will be involved in future planning efforts.
- Russell presented a Powerpoint presentation with highlights of the SWPP draft and accepted comments from the group.
    - The protection recommended that the public meeting be held in conjunction with the regularly scheduled PSD board meeting on May 6 at 10:00 AM. Terry will publicize this event so that the public is aware.
    - The actual design capacity of the treatment plant in 648,000 gal.
    - The PSD is in the process of adding 2 50,000 gal. tanks and adding 160 customers with the upcoming system expansion.
    - The treatment plant got new raw water pumps in 2005.
    - The historic and active mines upstream of the intake are still the #1 priority for the water system. The team reported that some of these had old electrical substations that have leaked PCBs, roughly 6-8 years ago. There are also still old underground mine shafts that could potentially leak or blow out at any time, but these are closely monitored by the water system staff. The operators could shut down until the issue was resolved. The gob pile mentioned in the old plan is also still an issue.
    - The DOH headquarters in the old plan is still in the planning phase and has not been constructed. This can be removed.
    - The propane site shouldn't be a problem for the system. It is located upstream of the intake, but utility staff do not believe that the propane would affect water quality even if there was some kind of leak. Can be removed from priorities.
    - Nutrient levels during certain times of year are still a concern but the operators understand how to manage these challenges as they arise.
    - Regarding the aerial spraying, the utility staff will contact DOH about spraying schedules and types of chemicals that are used.
    - The earthen dam at Camp Caesar Lake could be an issue for the water system if it broke and released a large quantity of water. This dam is inspected yearly and the camp staff have the contact information for the operators if there were a problem. Treatment plant staff would just close the intake until most of the water had passed the plant.
    - The team requested that a locally-identified PSSC be added for the settling pond that lies just at the end of the ZCC, as well as any other major settling ponds that can be seen on aerial imagery.

- The primary mode of communication for the system is the Webster County 911 system that emergency services manages. This system provides information through radio and social media about important developments. They can also use the local newspaper.
- The system is in the process of permitting the intake on the Williams River, but the current alternative would be to either run a line from Camp Caesar Lake to the plant or pull water directly from Caesar Creek, which has sufficient supply most of the year. They have tried in the past to get an agreement with the Forest Service to pull water from the lake but haven't had any luck. They will keep trying.
- Terry requested a flyer to advertise the May 6 public meeting.

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.

Cowen PSD Designees:

Name	Title	Phone	Email	Signature	Date
Terry Wayne	Gen. MGR.	304-618-1604	CowenPSD@frontiernet.net	Terry Wayne	4-12-16
Lance M. Bragg	Chief	304-226-3191	Cowenfire@Yahoo.com	Lance M. Bragg	4-12-16
JOSEPH GARLAND	WATER PLANT OPER.	304-226-3541		Joseph R Garland	4-12-16
R.K. Shaver	Geol.	304/356-4296	Richard.K.Shaver@wv.gov	R.K. Shaver	4/12/16
Steve Wayne		[redacted]		Steve Wayne	4-12-16
Richard Rose	Emergency Manager	304-847-2122	websterops@citlink.net	Richard Rose	4-12-16

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Cowen PSD

Source Water Protection Plan - Public Meeting

Date 5/6/2016

Attendees:

Name	Organization	Email	Phone
Terry Wayne	MGR Cowen PSD	Cowenpsd@frontiernet.net	[redacted]
JIM GAMBLE	CPSD CHAIRPERSON	JHGAMBLE@FRONTIERNET.NET	
Amanda Smarr	Region 4 Planning & Dev. Council	asmarr@rg4wv.org	
Wade McKinney	Thrasher	Wmckinney@Thrashereng.com	
Anthony Brown	Thrasher	abrown@thrashereng.com	
Johnny Sandy	CPSD Board Member		
Pauline Miller	CPSD Board Member		
Shelly Brenner	CPSD office manage	Cowenpsd@frontiernet.net	
Nina Barker	CPSD	SAme ↑	

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GET INVOLVED IN SOURCE WATER PROTECTION

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

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

Your water system is committed to informing and engaging the public during development and implementation of this plan. Cowen PSD will hold a public meeting to allow customers to review and comment on the plan. Now is your chance to provide your input.

The public meeting will be held at the Cowen PSD office at 10:00 AM on May 6, 2016, before the regularly scheduled board meeting. For more information please contact the PSD office:

Phone: 304-226-3541
Email: cowenpsd@frontiernet.net

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