APPENDIX C

Source Water Assessment and Protection Plan
Susceptibility Analysis and Protection Recommendations for Bell County

PINEVILLE WATER SYSTEM (PWSID 0070353, WW 0772)

A. Source Water Protection Area

This aspect of water supply planning lays the foundation for proactive management of the source water. The two major components of Source Water Protection planning are (1) to evaluate the potential for contaminants to enter the water supply and (2) to develop recommendations for protection.

Introduction

Pineville Utility Commission, one of two public water systems in Bell County, sells water to Green Hills Water District and Cawood Water District in Harlan County and recently connected Frakes Elementary and Henderson Settlement in Bell County. The intake is assigned number WW 0772 and is located at mile 3.2 on Cannon Creek in Bell County.

Delineation

Delineation is the process of defining the area of land on which activities are likely to impact the quality of the drinking water source. Surface sources of water that are fed by large watersheds are typically divided into three zones, the largest of which may be smaller than the entire watershed upstream of the intake. Reference Map number WW 0772. Pineville only has one protection zone.

Maps illustrating the source water protection area of this public water system's surface water supplies are provided for the following surface water intakes: WW0772

What follows are the criteria used to define these protection zones:

- If the watershed extends for less than 25 miles upstream of the intake, the water supply protection area (Zone III) extends the entire watershed yet is segmented (where size permits) into a Critical Zone (Zone I) and a Zone of Responsibility (Zone II), according to the following scheme.

- If the watershed extends more than 25 miles upstream from the point of intake, the water supply protection area includes three protection zones.

Zone I - The **Critical Zone** begins 1/4 mile below the intake and extends 5 miles upstream of the intake, along any stream that is 3rd order or above (on 1:24,000 scale maps), and including ¼ mile on each side of those streams (or to the nearest watershed boundary if it is within ¼ mile. [Note: this is in keeping with Kentucky's "five-mile" wastewater discharge policy, which prohibits permitted (KPDES) discharges within five miles upstream of a water supply intake.]

The protection area for Cannon Creek Lake is the entire watershed. There has been some strip mining in the past, but not much development is occurring in this zone at present. This protection zone includes Log and Canada Mountains.

Susceptibility Considerations

Numerous considerations are used in determining the susceptibility of a public water supply source to potential contamination. The degree of susceptibility is related to several factors. EPA recommends site-specific factors be examined in determining susceptibility. Factors include: (1) **Contaminant source characteristics** and threat to public health; (2) **Proximity** of the potential source of contamination to the intake; (3) **Likelihood of release** for the contaminant source. Each factor is given susceptibility values of 1 to 3. To calculate the final susceptibility rating for each potential contaminant source, each of the factors above has been weighted. Contaminant characteristics or hazard to human health factor is given a weight of X3, Proximity of the contaminant source to the intake factor is given a weight of X2 while likelihood of release and hydrologic sensitivity factor are given a weight of X1. A potential contaminant with a high rating has an overall ranking greater than 15. Any potential contaminant with a medium rating has an overall ranking of 10 to 14. When a potential contaminant has a low rating, its ranking is less than 10.

B. Water Supply Risks

1. Potential Contaminant Sites

Potential contaminants sites are those locations, in delineated protection areas, where human activities are taking place that are likely to create some risk of contaminants entering the source of public water supply. To identify these sites, the Water Management Planning Council members from Bell County and Cumberland Valley ADD staff reviewed the potential contamination database supplied by the Kentucky Division of Water.

For a complete listing of all the potential contaminant sources for this public water system, see the contaminant source inventory table.

2. Soils and Geology

The geological features of Bell County are mostly composed of Pennsylvanian Rock. Pennsylvanian rocks in Kentucky are composed primarily of interbedded shale, sandstone, conglomerates, and coals. Thin limestone beds may also occur. A Pennsylvanian stratum tends to contain large amounts of coal. The general soils for Cannon Creek are: Shelocta-Gilpin-Kimper: very deep to moderately deep soils that have a loamy subsoil, in mountainous areas with relief of 600 to 1,200 feet. Shelocta soils are well drained. The available water capacity is moderate to high making the ability of contaminants to travel through the soils quickly. Gilpin soils are well drained. These soils are generally unsuited to septic tank absorption fields because of the depth of bedrock. Kimper soils are well drained. These soils erode easily. This soil generally is poorly suited for bulding development unless sewer facilities are available.

3. Susceptibility Analysis

The following is a discussion of potential contaminant sources identified in Pineville's Source Water Protection Areas. Cannon Creek Lake is discussed below:

Cannon Creek (WW 0772)

Non-point-source pollution, or "polluted runoff," is created when rain, snowmelt, irrigation water, and other water sources run over the land, picking up pollutions and transporting them to local water bodies.

Non-point-source pollution is also called "people pollution" because much of it is the result of activities that people do everyday. With each rainfall, pollutants are washed from surface and land areas into storm drains, ditches, sinkholes or streams that flow into our nearby waterways. Because each individual contributes to non-point-source pollution simply by performing daily activities, it is not surprising that non-point-source pollution is the biggest threat to our waterways.

Forest/Woodlands Land Cover: This type of land cover could be subject to logging which may result in soil erosion if Best Management Practices (BMPs) are not carefully applied. This potential contaminant is listed twice for Pineville Utility Commission with high ratings.

Power line rights-of-way may be treated with herbicides. Surface runoff could carry these herbicides to source waters.

Major **oil and gas** transmission mains are not shown on SWAPP maps or database for security reasons. Information about their location can be obtained from the Division of Water (DOW) upon request.

Failing septic tanks and straight sewer pipes from individual homes are not shown on the map or on the SWAPP database due to uncertainty of their locations. Although there are very few homes proven to have them, several areas of suspected concentrations of straight pipes are located within Bell County, some within the protection zone.

4. Existing Local Regulatory Protection Measures

The Bell County fiscal court has approved the second reading of an ordinance requiring residents to connect to an approved wastewater system as soon as it becomes available to them in addition, Bell County has mandatory garbage collection. The City of Pineville and the Pineville Utility Commission are jointly committed to the protection of the watershed. On April 8, 1988, they successfully had the watershed declared unsuitable for surface mining, and the City of Pineville, by ordinance, had declared the lake off limits to gasoline powered boating and swimming in the reservoir. These efforts combined with on going measures of the water company personnel, the 109 Board, along with the Bell County Detention Center, picks up trash around the reservoir demonstrating that they are committed to the protection of their resources in Bell County.

5. Protection Recommendations

Pineville's potential contaminants threat is forest woodland cover.

Below are listed the Management Recommendations for land cover.

1. Monitor to ensure compliance with Forestry Conservation Act.
2. Require BMP (Best Management Practices) implementation per the Forest Landowners Handbook.

The City of Pineville's Planning and Zoning Commission will be provided with a copy of SWAPP Plan and the water supply protection area map, and be encouraged to include within their review criteria for new development. It would also be suggested that the Commission review subdivision and development standards to determine if any further features need to be incorporated into those standards that might mitigate the chances for contamination in supply protection areas.

6. Security of Access

Security access around the plant: chain link fence around the site and an employee is there 24 hours a day.

U.S. UTILITIES/MIDDLESBORO (PWSID 0070282, WW 0008)

A. Source Water Protection Area

This aspect of water supply planning lays the foundation for proactive management of the source water. The two major components of Source Water Protection planning are (1) to evaluate the potential for contaminants to enter the water supply and (2) to develop recommendations for protection.

Introduction

Water Service Corporation of Kentucky (formally U.S. Utilities), one of two public water treatment plants in Bell County, serves the City of Middlesboro. The intake has been assigned number WW 0008 to withdraw water from Fern Lake an impounded lake at mile point 3.2 on Little Yellow Creek.

Delineation

Delineation is the process of defining the area of land on which activities are likely to impact the quality of the drinking water source. Surface sources of water that are fed by large watersheds are typically divided into three zones, the largest of which may be smaller than the entire watershed upstream of the intake. Fern Lake protection area encompasses the entire watershed. Reference map number WW 0008. There is only one protection zone around the intake.

Maps illustrating the source water protection area of this public water system's surface water supplies are provided for the following surface water intakes: WW0008

What follows are the criteria used to define these protection zones:

- For most intakes that draw from reservoirs, the water supply protection area will include the entire watershed, segmented (as size permits) into subsections according to the following scheme.
- For intakes in extremely large reservoirs (e.g. Lake Cumberland), the water supply protection areas include three protection zones. These are intended to parallel the protection areas used in the Wellhead Protection Program. If the intake is in a river embayment or the upper reaches of the reservoir, segmentation rules for river intakes may apply.

Zone I - The **Critical Zone** begins ¼ mile below the intake site and extends 1 mile upstream of the intake, measured in the thalweg (channel), and on the land along each side, ¼ mile from normal pool level of the reservoir (or to the nearest watershed boundary if it is within ¼ mile), and up 3rd order streams. If this segment of the reservoir is more than ½ mile wide and the thalweg is on the intake side of the reservoir throughout this segment, the Critical Zone may include only the intake shore of the reservoir.

The protection area for Fern Lake is the entire watershed. On the Kentucky side, the there is little development in the protection zone. The watershed is in the Cumberland Gap National Park in both Kentucky and Tennessee.

Susceptibility Considerations

Numerous considerations are used in determining the susceptibility of a public water supply source to potential contamination. The degree of susceptibility is related to several factors. EPA recommends site-specific factors be examined in determining susceptibility. Factors include: (1) **Contaminant source characteristics** and threat to public health; (2) **Proximity** of the potential source of contamination to the intake; (3) **Likelihood of release** for the contaminant source. Each

factor is given susceptibility values of 1 to 3. To calculate the final susceptibility rating for each potential contaminant source, each of the factors above has been weighted. Contaminant characteristics or hazard to human health factor is given a weight of X3, Proximity of the contaminant source to the intake factor is given a weight of X2 while likelihood of release and hydrologic sensitivity factor are given a weight of X1. A potential contaminant with a high rating has an overall ranking greater than 15. Any potential contaminant with a medium rating has an overall ranking of 10 to 14. When a potential contaminant has a low rating, its ranking is less than 10.

B. Water Supply Risks

1. Potential Contaminant Sites

Potential contaminants sites are those locations, in delineated protection areas, where human activities are taking place that are likely to create some risk of contaminants entering the source of public water supply. To identify these sites, the Water Management Planning Council members from Bell County and Cumberland Valley ADD staff reviewed the potential contamination database supplied by the Kentucky Division of Water.

For a complete listing of all the potential contaminant sources for this public water system, see the contaminant source inventory table.

2. Soils and Geology

The geological features of Bell County are mostly composed of Pennsylvanian Rock. Pennsylvanian rocks in Kentucky are composed primarily of interbedded shale, sandstone, conglomerates, and coals. Thin limestone beds may also occur. A Pennsylvanian stratum tends to contain large amounts of coal. The Pine Mountain thrust fault runs though Zone 1 for Middlesboro. The pressures from mountain building caused the northeast edge of a block of Devonian, Mississippian, and Pennsylvanian strata to be pushed upward, forming a 125-mile long ridge that we call Pine Mountain. The general soils for Fern Lake are: Shelocta-Gilpin-Kimper: very deep to moderately deep soils that have a loamy subsoil, in mountainous areas with relief of 600 to 1,200 feet. Shelocta soils are well drained. The available water capacity is moderate to high making the ability of contaminants to travel through the soils quickly. Gilpin soils are well drained. These soils are generally unsuited to septic tank absorption fields because of the depth of bedrock. Kimper soils are well drained. These soils erode easily. This soil generally is poorly suited for bulding development unless sewer facilities are available. As well as, Helechawa-Altichrest-Varilla: very steep, deep and very deep, well drained and somewhat excessively drained soils; on mountains. In most areas these soils are unsuited to urban development because of slope.

3. Susceptibility Analysis

The following is a discussion of potential contaminant sources identified in Water Service Corporation of Kentucky's Source Water Protection Area. Fern Lake is discussed below:

Fern Lake (WW 0008)

Non-point-source pollution, or "polluted runoff," is created when rain, snowmelt, irrigation water, and other water sources run over the land, picking up pollutions and transporting them to local water bodies.

Non-point-source pollution is also called "people pollution" because much of it is the result of activities that people do everyday. With each rainfall, pollutants are washed from surface and land areas into storm drains, ditches, sinkholes or streams that flow into our nearby waterways. Because each individual contributes to non-point-source pollution simply by performing daily activities, it is not surprising that non-point-source pollution is the biggest threat to our waterways.

Forest/Woodlands Land Cover: This type of land cover could be subject to logging which may result in soil erosion if Best Management Practices (BMPs) are not carefully applied.

WSCoK has an overall high rating due to the following contaminant source specific information from the Division of Water: (1) If any protection zone has more than 3% of its area covered by land cover for Deciduous Forest then it is considered to be a contaminant source for that protection zone. (2) If any protection zone has more than 3% of its area covered by land cover for Evergreen Forest then it is considered to be a contaminant source for that protection zone. (3) If any protection zone has more than 3% of its area covered by land cover for Mixed Forest then it is considered to be a contaminant source for that protection zone.

4. Existing Local Regulatory Protection Measures

The Bell County fiscal court has approved the second reading of an ordinance requiring residents to connect to an approved wastewater system as soon as it becomes available to them in addition, Bell County has mandatory garbage collection.

5. Protection Recommendations

Water Service Corporation of KY's largest potential contaminant threat is land coverage. Below are listed the Management Recommendations for land coverage.

1. Monitor to ensure compliance with Forestry Conservation Act.
2. Require BMP (Best Management Practices) implementation per the Forest Landowners Handbook.

The City of Middlesboro's Planning and Zoning Commission will be provided with a copy of SWAPP Plan and the water supply protection area map, and be encouraged to include within their review criteria for new development. It would also be suggested that the Commission review subdivision and development standards to determine if any further features need to be incorporated into those standards that might mitigate the chances for contamination in supply protection areas.

6. Security of Access

Fern Lake is an impounded privately owned watershed. Security access around the plant: alarm system at the plant and fence around the site. Security access around the intake: fencing around the intake and the pumps.