

COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

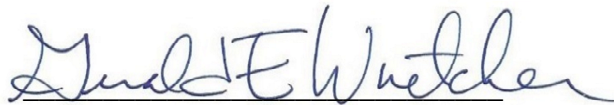
ELECTRONIC INVESTIGATION INTO)
EXCESSIVE WATER LOSS BY KENTUCKY'S) CASE NO. 2019-00041
JURISDICTIONAL WATER UTILITIES)

NOTICE OF FILING

Pursuant to the Commission's Order of November 22, 2019, as amended by the Commission's Orders of April 7, 2020 and September 10, 2020, Big Sandy Water District gives notice of its filing of the results of a comprehensive water audit. This audit was conducted with the assistance of the Kentucky Water Resources Research Institute and in accordance with the procedures set forth in the American Water Works Association's *Water Audits and Loss Control Programs* (Manual M36 4th ed.).

Dated: January 28, 2021

Respectfully submitted,

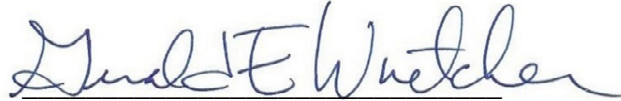


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Counsel for Big Sandy Water District

CERTIFICATE OF SERVICE

In accordance with 807 KAR 5:001, Section 8, I certify that Big Sandy Water District's electronic filing of this Notice of Filing is a true and accurate copy of the same document being filed in paper medium; that the electronic filing was transmitted to the Public Service Commission on January 28, 2021; that there are currently no parties that the Public Service Commission has excused from participation by electronic means in this proceeding; and that within 30 days following the end of the state of emergency announced in Executive Order 2020-215 this Notice of Filing in paper medium will be delivered to the Public Service Commission.

A handwritten signature in blue ink, reading "Gerald E. Wuetcher". The signature is written in a cursive style with a horizontal line underneath the name.

Gerald E. Wuetcher

AWWA Free Water Audit Software: Worksheet

FWAS v6.0

American Water Works Association

Water Audit Report for: **Big Sandy Water District**
 Audit Year: **2019** Jan 01 2019 - Dec 31 2019 Calendar

Click 'n' to add notes Click 'g' to determine data validity grade To edit water system info: [go to start page](#)

To access definitions, click the **input name**

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

Water Supplied Error Adjustments

choose entry option:

WATER SUPPLIED

VOS	Volume from Own Sources:	<input type="text" value="n"/>	<input type="text" value="g"/>	<input type="text" value="1"/>	<input type="text" value="0.000"/>	MG/Yr	
WI	Water Imported:	<input type="text" value="n"/>	<input type="text" value="g"/>	<input type="text" value="1"/>	<input type="text" value="392.400"/>	MG/Yr	<input type="text" value="n"/>
WE	Water Exported:	<input type="text" value="n"/>	<input type="text" value="g"/>	<input type="text" value="1"/>	<input type="text" value="0.000"/>	MG/Yr	<input type="text" value="3"/>
<input type="text" value="percent"/>							
					WATER SUPPLIED: 392.400	MG/Yr	

VOSEA
WIEA
WEEA

AUTHORIZED CONSUMPTION

BMAC	Billed Metered:	<input type="text" value="n"/>	<input type="text" value="g"/>	<input type="text" value="8"/>	<input type="text" value="226.600"/>	MG/Yr	
BUAC	Billed Unmetered:	<input type="text" value="n"/>	<input type="text" value="g"/>	<input type="text" value="8"/>	<input type="text" value="0.000"/>	MG/Yr	
UMAC	Unbilled Metered:	<input type="text" value="n"/>	<input type="text" value="g"/>	<input type="text" value="n/a"/>	<input type="text" value=""/>	MG/Yr	
UUAC	Unbilled Unmetered:	<input type="text" value="n"/>	<input type="text" value="g"/>	<input type="text" value="8"/>	<input type="text" value="0.827"/>	MG/Yr	
					AUTHORIZED CONSUMPTION: 227.427	MG/Yr	

choose entry option:

MG/Yr

WATER LOSSES

164.973 MG/Yr

Apparent Losses

Default option selected for Systematic Data Handling Errors, with automatic data grading of 3

SDHE	Systematic Data Handling Errors:	<input type="text" value="n"/>	<input type="text" value="g"/>	<input type="text" value="3"/>	<input type="text" value="0.567"/>	MG/Yr	
CMI	Customer Metering Inaccuracies:	<input type="text" value="n"/>	<input type="text" value="g"/>	<input type="text" value="4"/>	<input type="text" value="25.178"/>	MG/Yr	
UC	Unauthorized Consumption:	<input type="text" value="n"/>	<input type="text" value="g"/>	<input type="text" value="3"/>	<input type="text" value="0.567"/>	MG/Yr	
					Apparent Losses: 26.311	MG/Yr	

choose entry option:

under-registration

Real Losses

Real Losses: 138.662 MG/Yr

WATER LOSSES: 164.973 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 165.800 MG/Yr

SYSTEM DATA

Lm	Length of mains:	<input type="text" value="n"/>	<input type="text" value="g"/>	<input type="text" value="1"/>	<input type="text" value="450.0"/>	miles	(including fire hydrant lead lengths)
Nc	Number of service connections:	<input type="text" value="n"/>	<input type="text" value="g"/>	<input type="text" value="10"/>	<input type="text" value="5,600"/>		(active and inactive)
					Service connection density: 12	conn./mile main	
Are customer meters typically located at the curbside/property line? <input type="text" value="No"/>							
Lp	Average length of (private) customer service line:	<input type="text" value="n"/>	<input type="text" value="g"/>	<input type="text" value="1"/>	<input type="text" value="15.0"/>	ft	(average distance between property line and meter)
AOP	Average Operating Pressure:	<input type="text" value="n"/>	<input type="text" value="g"/>	<input type="text" value="7"/>	<input type="text" value="161.0"/>	psi	

COST DATA

CRUC	Customer Retail Unit Charge:	<input type="text" value="n"/>	<input type="text" value="g"/>	<input type="text" value="5"/>	<input type="text" value="\$7.55"/>	\$/1000 gallons (US)	
VPC	Variable Production Cost:	<input type="text" value="n"/>	<input type="text" value="g"/>	<input type="text" value="5"/>	<input type="text" value="\$252.00"/>	\$/1000 gallons <<< Using CRUC as basis for VPC	<input type="text" value="\$16,169,055"/>
							Total Annual Operating Cost \$/yr (optional input)

WATER AUDIT DATA VALIDITY TIER:

*** The Water Audit Data Validity Score is in Tier II (26-50). See Dashboard tab for additional outputs. ***

[go to dashboard](#)

A weighted scale for the components of supply, consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION TO IMPROVE DATA VALIDITY:

Based on the information provided, audit reliability can be most improved by addressing the following components:

- 1: Water Imported (WI)
- 2: Length of Mains (Lm)
- 3: Customer Metering Inaccuracies (CMI)

KEY PERFORMANCE INDICATOR TARGETS:

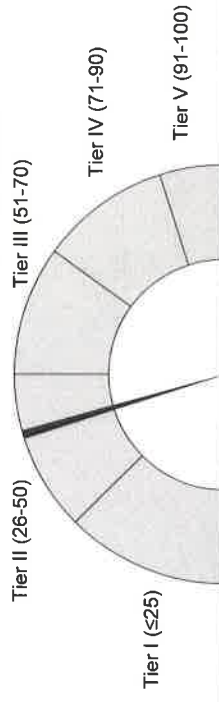
OPTIONAL: If targets exist for the operational performance indicators, they can be input below:

Unit Total Losses: gal/conn/day
 Unit Apparent Losses: gal/conn/day
 Unit Real Losses*: gal/conn/day
 Unit Real Losses**: gal/mile/day

If entered above by user, targets will display on KPI gauges (see Dashboard)

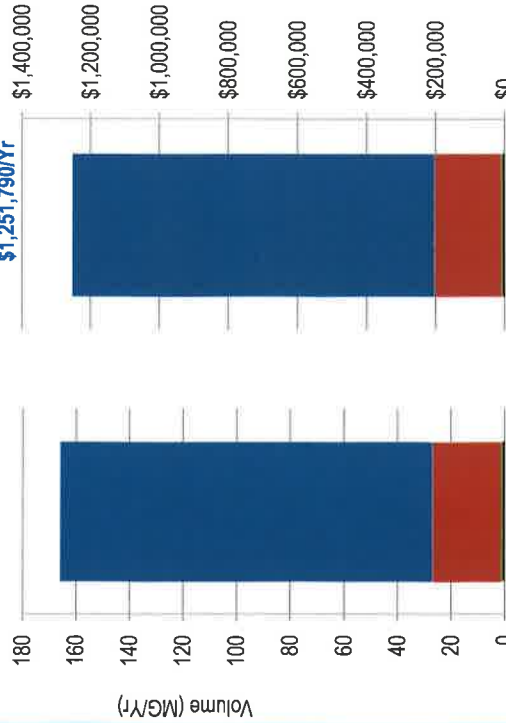
Data Validity

Data Validity Score: 40 Data Validity Tier: **Tier II (26-50)**
See Loss Control Planning for Tier Details



NRW Components Summary

Total Volume of NRW = 166 MG/Yr
Total Cost of NRW = \$1,251,790/Yr



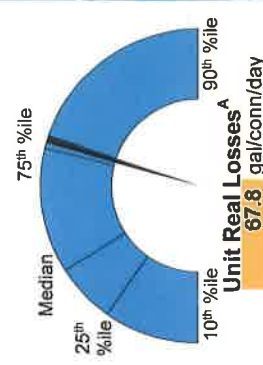
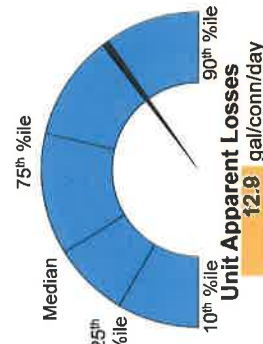
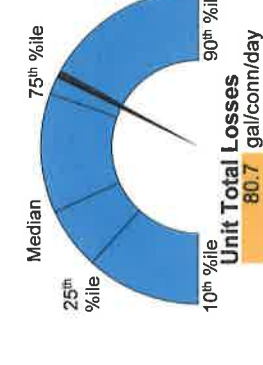
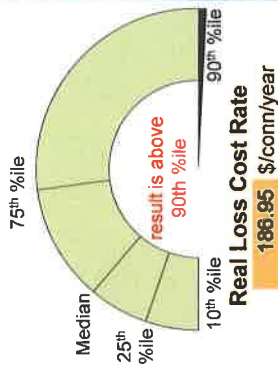
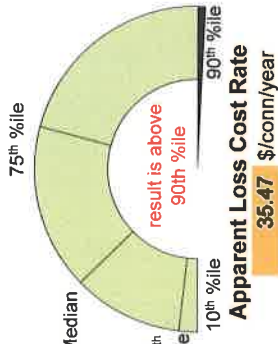
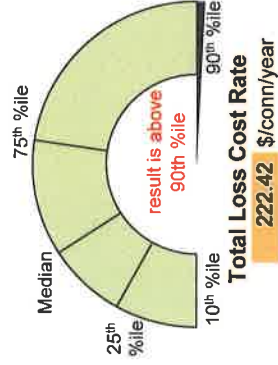
Component	Volume (MG/Yr)	Value (\$/Yr)	Basis of Valuation
Real Losses	138.7	\$1,046,900	CRUC
Systematic Data Handling Errors	28.3	\$198,646	CRUC
Customer Metering Inaccuracies	0.8	\$6,244	CRUC
Total	166.8	\$1,251,790	CRUC

Actual KPI result

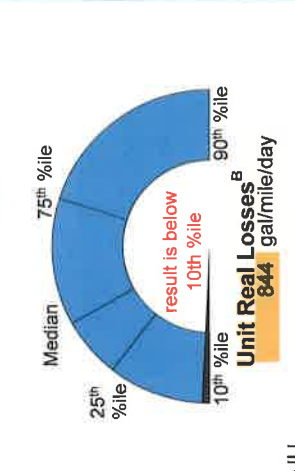
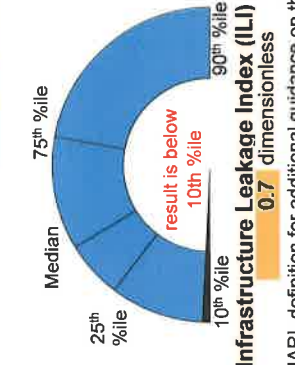
Key Performance Indicators

gauge %iles per validated industry ranges²

Target (see Worksheet)



Average Operating Pressure



See UARL definition for additional guidance on the ILI

(UARL) Unavoidable Annual Real Losses 199.4 MGYr 97.6 gal/conn/day

Guidance Information for Key Performance Indicators

- The eight indicators shown are the recommended suite per the AWWA Water Loss Control Committee 2020 Position on KPIs¹.
- A suite of KPIs is necessary, as no single KPI can holistically communicate water loss performance for a given water system.
- See Table 1 below for Uses and Limitations for each KPI, excerpted from the AWWA Water Loss Control Committee Report (2020)¹, with naming conventions updated.
- Percentiles (%iles) shown on KPI gauges come from Level 1 validated data in the AWWA WLCC Reference Water Audit Dataset (2020)².
- KPI %iles shown above are not segregated by cohorts. Limited density should use caution when interpreting Unit Losses KPIs.
- Systems that fall on the extreme ends of size or connection pressure limitations.
- See UARL and ILI in Definitions tab for discussion of size and pressure limitations.
- Actual KPI results that fall below 10th %ile or above 90th %ile do not necessarily imply error, but should be viewed with scrutiny.
- Percentiles not intended to imply targets. Targets may be input by user for operational KPIs, if desired, on Worksheet.
- See UARL and ILI in Definitions tab for discussion of size and pressure limitations.
- Systems that fall on the extreme ends of size or connection density should use caution when interpreting Unit Losses KPIs.

Table 1
2020 AWWA Water Audit Method – Water Audit Outputs and Key Performance Indicators: Uses and Limitations

Type	Indicator	Description	Suitable Purposes				Principal Users	
			Assessment	Bench-Marking	Target-Setting	Planning		Tracking
Attribute	Apparent Loss Volume	Calculated by Free Water Audit Software	✓				✓	Utility, Regulators
	Apparent Loss Cost	Calculated by Free Water Audit Software	✓				✓	Utility, Regulators
	Real Loss Volume	Calculated by Free Water Audit Software	✓				✓	Utility, Regulators
	Real Loss Cost	Calculated by Free Water Audit Software	✓				✓	Utility, Regulators
	Unavoidable Annual Real Loss (UARL)	Calculated by Free Water Audit Software	✓				✓	Utility, Regulators
Volume	Unit Apparent Losses (vol/conn/day)	Strong and understandable indicator for multiple users.	✓	✓	✓		✓	Utility, Regulators
	Unit Real Losses ^A (vol/conn/day)	Strong and understandable indicator for multiple users.	✓	✓	✓		✓	Utility, Regulators, Policy Makers
	Unit Real Losses ^B (vol/pipeline length/day)	Strong and understandable indicator for use by utilities with low connection density.	✓	✓	✓		✓	Utility, Regulators, Policy Makers
	Unit Total Losses (vol/conn/day) New KPI	Strong and understandable indicator, suitable for high-level performance measurement.	✓				✓	Utilities, Customers
	Infrastructure Leakage Index (ILI)	Robust, specialized ratio KPI; can be influenced by pressure and connection density.	✓	✓			✓	Utilities
Value	Apparent Loss Cost Rate (value/conn/year) New KPI	Indicators with sufficient technical rigor. Provide the unit financial value of each type of loss, which is useful for planning and assessment of cost efficiency of water loss reduction and control interventions and programs.	✓			✓	✓	Utilities, Regulators, Customers
	Real Loss Cost Rate (value/conn/year) New KPI	Strong indicator of water loss audit data quality, if data has been validated. Tier provides guidance on priority areas of activity.	✓			✓	✓	Utilities, Regulators, Customers
Validity	Data Validity Tier (DVT)	Strong indicator of water loss audit data quality, if data has been validated. Tier provides guidance on priority areas of activity.	✓	✓			✓	Regulators, Utilities