This paper is intended to define an initial distribution system evaluation and that the purpose of these studies on water systems.

Initial Distribution System Evaluation (IDSE)

IDSEs are an important part of the Stage 2 Disinfectants/Disinfection Byproducts Rule (Stage 2 DBPR). They are one-time studies conducted by water systems to identify distribution system locations with high concentrations of trihalomethanes (THMs) and haloacetic acids (HAAs). Water systems will use results from the IDSE, in conjunction with their Stage 1 Disinfectants/Disinfection Byproducts Rule (Stage 1 DBPR) compliance monitoring data, to select compliance monitoring locations for the Stage 2 DBPR.

To meet IDSE requirements, it is necessary to conduct a System Specific Study (SSS) using existing monitoring results or a distribution system hydraulic model. For purposes of the modeling SSS, water age is used to surrogate for TTHM Concentration. The minimum requirement for the SSS is a hydraulic model.

A water quality model may provide a better understanding of the distribution system compared to hydraulic model only. However, a water quality model is much harder to calibrate and less accurate. A model must be an extended period simulation (EPS) model and must be calibrated for the Peak Month for TTHM formation. And a model must be calibrated in an extended period simulation for at least a 24-hour period. For water age, results should be reported once the model gives stable, repeating portions of the simulation.

The calibration/field test water quality locations chosen must match requirements of the IDSE (near entry points, high TTHM, high HAA5, and average residence time).

- Near entry point - should be between where water enters the distribution system and no later than the 1st customer.
- Average residence time site - should be flow-weighted or population-weighted estimate.
- High TTHM Sites – assume sites with highest water age. Dead-ends may not be accurate. Small diameter pipes may not be as accurate as large diameter, as more variations exist.
- High HAA5 Sites – higher temperature, longer residence times.
- Consider geographic coverage and other factors to finalize site selection.

Minimum requirements of the IDSE Report include:

- Analytical results from Stage 1 DBPR compliance monitoring and SSS monitoring in a tabular or spreadsheet format.
- An updated system schematic, if changed from your modeling study plan (required if you did not indicate SSS monitoring locations in your study plan).
- Final information on model requirements, calibration, and modeling analysis, if changed or new since submittal of your study plan, including tables and graphs.
- A 24-hour time series graph of residence time for each Stage 2 DBPR compliance monitoring location selected.
- Selected Stage 2 DBPR compliance monitoring locations and timing, including the basis (analytical results and modeling) and justification for selection of those locations.
- Population served and system type (subpart H or ground water) if changed from your modeling study plan.
- An explanation of any deviations from your approved study plan.

Minimum Requirements Checklist for an SSS
Using a Distribution System Hydraulic Model
Checklist 2.1

Yes	No	
		Does your model run in extended period simulation?
		Does it simulate 24-hr variation in demand and show a consistently repeating 24-hr pattern of 24-hr residence time?
		Does your model include 75% of pipe volume?
		Does it include 50% of pipe length?
		Does it represent all pressure zones?
		Does your model include all 12” diameter and larger pipes?
		Does your model include all 8” diameter and larger pipes that connect pressure zones, influence zones from different sources, storage facilities, major demand areas, pumps, and control valves or are known or expected to be significant conveyors of water?
		Does it include all 6” diameter and larger pipes that connect remote areas of the distribution system to the main portion of the system?
		Are all storage facilities with standard operations represented in your model?
		Are all active pump stations with controls represented in your model?
		Does your model include all active control valves?
		Has your model been calibrated (or do you have plans to complete calibration in the next 12 months) for the current configuration of the distribution system during periods of high TTHM formation potential?
		Were all storage facilities evaluated as part of the calibration process?

Minimum Requirements Checklist for an SSS
Using Existing Monitoring Results
Checklist 2.2

Yes	No	
		Do you have at least the minimum number of distribution system monitoring locations shown in the table below from which you collected TTHM and HAA5 samples?
		Do you have at least the minimum number of TTHM samples and HAA5 samples shown in the table below?
		Was each monitoring location sampled once during the month of high TTHM, high HAA5 or warmest water temperature for every 12 months of data?
		Were all samples collected and analyzed in accordance with an approved EPA method and by a certified laboratory?
		Were all sample results collected no earlier than five years prior to your SSS plan submission deadline?
		Have your distribution system and treatment not changed significantly since you collected your samples?
		Are your existing monitoring locations representative of your entire distribution system?

Source Water Type	System Size Category (Population Served)	Minimum Number of Monitoring Locations	Minimum Number of Samples	
			TTHM	HAA5
Subpart H	<500	3	3	3
	500-3,300	3	9	9
	3,301-9,999	6	36	36
	10,000-49,999	12	72	72
	50,000-249,999	24	144	144
	250,000-999,999	36	216	216
	1,000,000-4,999,999	48	288	288
	≥5,000,000	60	360	360
Ground Water	<500	3	3	3
	500-9,999	3	9	9
	10,000-99,999	12	48	48
	100,000-499,999	18	72	72
	≥500,000	24	96	96

For the purposes of the modeling SSS, water age is used as a surrogate for TTHM concentration. Thus, the minimum requirements for the modeling SSS are focused only on the hydraulic component of distribution system models. A well-calibrated water quality model may provide a better understanding of the behavior of the distribution system. However, proper calibration of the water quality component can be a difficult task and is typically done with much less accuracy than calibration of the hydraulic component. In addition, the data needed to properly calibrate and verify the water quality concentrations predicted by the model may be extensive.

For more information regarding Initial Distribution System Evaluation (IDSE), contact Floyd Browne Group at 740-363-6792.