

Form 5: IDSE Report for a Modeling SSS

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I. GENERAL INFORMATION

(Skip this section if you are submitting the plan and report at the same time)

A. PWS Information*

PWSID: US1111111

PWS Name: Big City Water System

PWS Address: 1234 Main Street

City: Big City State: US Zip: 99999

Population Served: 57,000

B. Date Submitted*

2/17/09

System Type:

- CWS
 NTNCWS

Source Water Type:

- Subpart H
 Ground

Buying / Selling Relationships:

- Consecutive System
 Wholesale System
 Neither

C. PWS Operations

Residual Disinfectant Type: Chlorine Chloramines Other: _____

Number of Disinfected Sources: 1 Surface 0 GWUDI 0 Ground 0 Purchased

D. Contact Person*

Name: Mr. John Smith, P.E.

Title: Water System Manager

Phone Number: 123-555-0000

Fax: 123-555-0001

E-mail: jsmith@ci.bigcity.us

II. SSS AND STAGE 2 DBPR REQUIREMENTS*

A. Number of Required Stage 2 DBPR Compliance Monitoring Sites 8 TOTAL

3 Highest TTHM 2 Stage 1 DBPR

3 Highest HAA5

B. IDSE Schedule

- Schedule 1
 Schedule 2
 Schedule 3
 Schedule 4

C. Required Stage 2 DBPR Monitoring Frequency

- Once during peak historical month
 Every 90 days (4 monitoring periods)

D. Number of Required SSS Samples

16 TOTAL

III. MODELING INFORMATION

(Skip this section if you submitted a modeling study plan with an approved model calibration and your information has not changed, or if you are submitting your plan and report at the same time)

A. How was demand data assigned to the model? (attach additional sheets if needed)

1.	What method was used to assign demands throughout the system?	
2.	How did you estimate diurnal demand variation? How did you determine total system demand?	
3.	How many demand categories did you use?	
4.	How did you address large water users?	

B. Describe all calibration activities undertaken* (attach additional sheets if needed)

1.	When was the model last calibrated?	
2.	What types of data were used in the calibration?	
3.	When was the calibration data collected?	
4.	What field tests have been performed to collect calibration data?	

III. MODELING INFORMATION (Continued)

<p>5. How did you determine friction factors (C-factors)?</p>	
<p>6. Was the calibration completed for the peak month for TTHM formation? If not, was the model performance verified for the peak month for TTHM formation?</p>	
<p>7. How well do actual tank levels correlate with predicted tank levels during the peak month for TTHM formation?</p> <p>Submit a graph of predicted tank levels vs. measured tank levels for the storage facility with the highest water age in each pressure zone*.</p>	
<p>8. If you are using a water quality model, what parameters are modeled? How was the model calibrated?</p>	

III. MODELING INFORMATION (Continued)

C. How was the SSS modeling performed?* (*attach additional sheets as needed*)

1.	Was modeling done for the operating conditions during the peak month for TTHM formation*?	
2.	How were operational controls represented in the model?	
3.	How was water age simulated during the peak month for TTHM formation (time steps, length of simulation, etc.)?	
4.	<p>What are the average water age results for your distribution system?</p> <p>Submit final model output showing 24-hour average residence time throughout the distribution system*.</p> <p>Submit graph of water age at the longest residence time storage facility in the distribution system showing the predictions for the entire EPS simulation period*.</p>	

IV. SSS MONITORING LOCATION SELECTION

How were the SSS monitoring locations selected? (*attach additional sheets as needed*)

1.	What model results were used as the basis for selection?	The average water age results from the last 24 hours of the 960 hour simulation were analyzed. Nodes were ranked by age and a histogram of water age ranges was created.
2.	What criteria were used in selecting average residence time, high TTHM, and high HAA5 sites?	The high TTHM and high HAA5 sites were selected with water ages in the range of 300 - 500 hours. These were the high results from the modeling (excluding zero demand nodes). The average water age was determined to be 20 hours based on the most frequently occurring age in the histogram.
3.	What additional data was used in the analysis, and how was it used?	TCR data for chlorine residual was examined for each potential sampling site. High water age locations with measurable residual were selected for high HAA5 sites. High water age locations with low residual chlorine were selected for high TTHM sites.
4.	How did you look at practical considerations like accessibility of sampling locations?	Once model nodes were identified, the proposed location was found on the paper water atlas sheets and an accessible sampling point was determined in the vicinity of the original node. Accessible locations served by the same water main as the model node were targeted. If the targeted water main was not accessible, an alternate location on a water main of the same diameter was found in the vicinity.
5.	How did you verify that your selected sampling locations corresponded to the selected node in your model?	Using the paper water atlas sheets and comparing the locations to the information in the hydraulic model, locations were verified.

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V. SSS AND STAGE 1 DBPR MONITORING RESULTS*

A. TTHM Results

Site ID & Category	Data Type	TTHM (mg/L)				LRAA
		3/12/08	6/7/08	8/22/08	10/1/08	
Stage 1 Site 1	Sample Date	3/12/08	6/7/08	8/22/08	10/1/08	
	Sample Result	0.041	0.048	0.062	0.050	0.050
Stage 1 Site 2	Sample Date	3/12/08	6/7/08	8/22/08	10/1/08	
	Sample Result	0.045	0.046	0.058	0.053	0.051
Stage 1 Site 3	Sample Date	3/12/08	6/7/08	8/22/08	10/1/08	
	Sample Result	0.051	0.055	0.075	0.059	0.060
Stage 1 Site 4	Sample Date	3/12/08	6/7/08	8/22/08	10/1/08	
	Sample Result	0.048	0.052	0.068	0.053	0.055
SSS-1 Entry	Sample Date			8/5/08		
	Sample Result			0.028		0.028
SSS-2 Average	Sample Date			8/5/08		
	Sample Result			0.048		0.048
SSS-3 Average	Sample Date			8/5/08		
	Sample Result			0.058		0.058
SSS-4 Average	Sample Date			8/5/08		
	Sample Result			0.067		0.067
SSS-5 Average	Sample Date			8/5/08		
	Sample Result			0.033		0.033
SSS-6 High TTHM	Sample Date			8/5/08		
	Sample Result			0.056		0.056
SSS-7 High TTHM	Sample Date			8/5/08		
	Sample Result			0.059		0.059
SSS-8 High TTHM	Sample Date			8/5/08		
	Sample Result			0.055		0.055

Attach additional sheets as needed for SSS and Stage 1 DBPR results.

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V. SSS AND STAGE 1 DBPR MONITORING RESULTS* (Continued)

B. HAA5 Results

Site ID & Category	Data Type	HAA5 (mg/L)				LRAA
		3/12/08	6/7/08	8/22/08	10/1/08	
Stage 1 Site 1	Sample Date	3/12/08	6/7/08	8/22/08	10/1/08	
	Sample Result	0.034	0.046	0.006	0.042	0.032
Stage 1 Site 2	Sample Date	3/12/08	6/7/08	8/22/08	10/1/08	
	Sample Result	0.030	0.045	0.044	0.042	0.040
Stage 1 Site 3	Sample Date	3/12/08	6/7/08	8/22/08	10/1/08	
	Sample Result	0.032	0.038	0.037	0.040	0.037
Stage 1 Site 4	Sample Date	3/12/08	6/7/08	8/22/08	10/1/08	
	Sample Result	0.040	0.004	0.012	0.044	0.025
SSS-1 Entry	Sample Date			8/5/08		
	Sample Result			0.018		0.018
SSS-2 Average	Sample Date			8/5/08		
	Sample Result			0.020		0.020
SSS-3 Average	Sample Date			8/5/08		
	Sample Result			0.019		0.019
SSS-4 Average	Sample Date			8/5/08		
	Sample Result			0.026		0.026
SSS-5 Average	Sample Date			8/5/08		
	Sample Result			0.033		0.033
SSS-6 High TTHM	Sample Date			8/5/08		
	Sample Result			0.048		0.048
SSS-7 High TTHM	Sample Date			8/5/08		
	Sample Result			0.057		0.055
SSS-8 High TTHM	Sample Date			8/5/08		
	Sample Result			0.046		0.046

Attach additional sheets as needed for SSS and Stage 1 DBPR results.

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V. SSS AND STAGE 1 DBPR MONITORING RESULTS* (Continued)

C. Where were your TTHM and HAA5 samples analyzed?

In-House

Is your in-house laboratory certified? Yes No

Certified Laboratory

Name of certified laboratory: _____

D. What method(s) was used to analyze your TTHM and HAA5 samples?

- | TTHM | HAA5 |
|---|--|
| <input checked="" type="checkbox"/> EPA 502.2 | <input checked="" type="checkbox"/> EPA 552.1 <input type="checkbox"/> EPA 552.2 |
| <input type="checkbox"/> EPA 524.2 | <input type="checkbox"/> EPA 552.3 <input type="checkbox"/> SM 6251 B |
| <input type="checkbox"/> EPA 551.1 | |

VI. SELECTION OF STAGE 2 DBPR COMPLIANCE MONITORING LOCATIONS

Describe the comparison of sampling and modeling results (*attach additional sheets as needed*):

1.	How well did the sampling results correspond to the modeling results?	For most SSS monitoring sites, the results were in accordance with the modeling results. Discrepancies were found at 2 sites: SSS-4 and SSS-11. SSS-4 was an average residence time site with TTHM results that were more typical of a high TTHM site. SSS-11 was a high TTHM site with TTHM results that were more typical of an average site.
2.	For samples that did not match well with model results, what follow-up investigations were performed?	At sites SSS-4 and SSS-11, data for chlorine residual was reviewed from TCR sampling. The time of sample collection was compared to the water age graph. The model results for water age at SSS-11 are highly variable and therefore that site was eliminated from further consideration. The discrepancy at SSS-4 could have been related to variation over time, although the model results are less conclusive at that site. SSS-4 was also eliminated from further consideration.
3.	Were additional samples collected? (Include data on table in section IV)	No
4.	Submit a graph of water age versus time for each selected sampling location*.	Graphs are attached.

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VII. JUSTIFICATION OF STAGE 2 DBPR COMPLIANCE MONITORING SITES*

Compliance Monitoring Site ID	Site Type	Justification
Stage 2 Site 1	<input checked="" type="checkbox"/> Highest TTHM <input type="checkbox"/> Highest HAA5 <input type="checkbox"/> Stage 1 DBPR	SSS-12 High average water age, high TTHM results during monitoring, located in East Pressure Zone
Stage 2 Site 2	<input type="checkbox"/> Highest TTHM <input checked="" type="checkbox"/> Highest HAA5 <input type="checkbox"/> Stage 1 DBPR	SSS-14 High average water age, high HAA5 results during monitoring, measurable residual in historical TCR data, located in East Pressure Zone
Stage 2 Site 3	<input type="checkbox"/> Highest TTHM <input type="checkbox"/> Highest HAA5 <input checked="" type="checkbox"/> Stage 1 DBPR	Stage 1 Site 2 Average residence time Stage 1 DBPR site with high HAA5 LRAA, relatively high water age, located in East Pressure Zone
Stage 2 Site 4	<input checked="" type="checkbox"/> Highest TTHM <input type="checkbox"/> Highest HAA5 <input type="checkbox"/> Stage 1 DBPR	SSS-9 High average water age, high TTHM results during monitoring, located in East Pressure Zone
Stage 2 Site 5	<input checked="" type="checkbox"/> Highest TTHM <input type="checkbox"/> Highest HAA5 <input type="checkbox"/> Stage 1 DBPR	SSS-15 High average water age, high TTHM results during monitoring, located in East Pressure Zone
Stage 2 Site 6	<input type="checkbox"/> Highest TTHM <input checked="" type="checkbox"/> Highest HAA5 <input type="checkbox"/> Stage 1 DBPR	SSS-10 High average water age, high HAA5 results during monitoring, measurable residual in historical TCR data, located in Central Pressure Zone
Stage 2 Site 7	<input type="checkbox"/> Highest TTHM <input type="checkbox"/> Highest HAA5 <input checked="" type="checkbox"/> Stage 1 DBPR	Stage 1 Site 4 High average water age, high TTHM historical data, located in West Pressure Zone
Stage 2 Site 8	<input type="checkbox"/> Highest TTHM <input checked="" type="checkbox"/> Highest HAA5 <input type="checkbox"/> Stage 1 DBPR	SSS-13 High average water age, high HAA5 results during monitoring, measurable residual in historical TCR data, located in East Pressure Zone

Attach additional copies of this sheet if you need more room.

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VIII. PEAK HISTORICAL MONTH

A. Peak Historical Month* August

B. Is Your Peak Historical Month the Same as your Peak Month for TTHM Formation in your Model Study Plan?

Yes No

If no, explain how you selected your new peak month for TTHM formation (attach additional sheets if needed):

IX. PROPOSED STAGE 2 COMPLIANCE MONITORING SCHEDULE*

Stage 2 Compliance Monitoring Site ID	Projected Sampling Date (date or week) ¹			
	period 1	period 2	period 3	period 4
Stage 2 Site 1	11/2012, wk 1	2/2013, wk 1	5/2013, wk 1	8/2013, wk 1
Stage 2 Site 2	11/2012, wk 1	2/2013, wk 1	5/2013, wk 1	8/2013, wk 1
Stage 2 Site 3	11/2012, wk 1	2/2013, wk 1	5/2013, wk 1	8/2013, wk 1
Stage 2 Site 4	11/2012, wk 1	2/2013, wk 1	5/2013, wk 1	8/2013, wk 1
Stage 2 Site 5	11/2012, wk 1	2/2013, wk 1	5/2013, wk 1	8/2013, wk 1
Stage 2 Site 6	11/2012, wk 1	2/2013, wk 1	5/2013, wk 1	8/2013, wk 1
Stage 2 Site 7	11/2012, wk 1	2/2013, wk 1	5/2013, wk 1	8/2013, wk 1
Stage 2 Site 8	11/2012, wk 1	2/2013, wk 1	5/2013, wk 1	8/2013, wk 1

¹ period = monitoring period. Complete for the number of monitoring periods from Section II.C.

Attach additional copies of this sheet if you need more room.

X. DISTRIBUTION SYSTEM SCHEMATIC*

*(Skip this section if you submitted a modeling study plan and your distribution system schematic **was complete** and has not changed from your approved modeling study plan, or if you are submitting the plan and report at the same time)*

ATTACH a schematic of your distribution system. If your schematic has changed or if you did not show your SSS monitoring locations on the distribution system schematic you submitted with your model study plan (Form 4), you must submit a revised distribution system schematic.

XI. ATTACHMENTS

- Tabular or spreadsheet documentation that your model meets minimum calibration requirements if updated since approved modeling study plan* (Section III).
- Additional sheets for explaining model information/results, including required graphs if not submitted as part of an approved modeling study plan* (Section III).
- Additional sheets for sampling results, if needed (Section V).
- Additional sheets for selection of Stage 2 DBPR compliance monitoring sites (Section VI).
- Graph of water age versus time for all Stage 2 DBPR sites selected* (Section VI).
- Additional sheets for justification of Stage 2 DBPR Monitoring Sites, if needed (Section VII). **REQUIRED if you are a subpart H system serving more than 249,999 people.**
- Additional sheets for explaining how you selected the peak historical month (Section VIII).
- Additional sheets for proposed compliance monitoring schedule (Section IX). **REQUIRED if you are a subpart H system serving more than 249,999 people.**
- Explanation of deviations from approved study plan.
- Distribution system schematic* (Section X). **REQUIRED if it has changed from your approved model study plan or if monitoring locations were not shown.**
- Compliance calculation procedures (for Stage 2 Compliance Monitoring Plan).

Total Number of Pages in Your Report: 25

Note: All items marked with an asterisk (*) are required by the rule.