

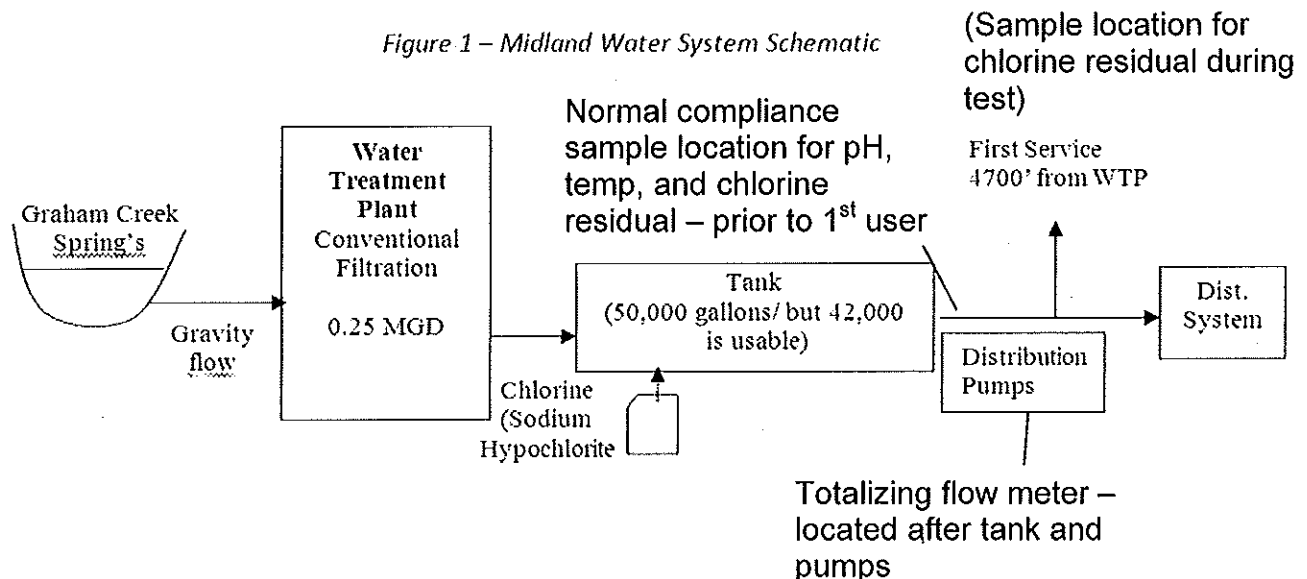
October 31, 2011

Rick Brown
Midland Water Association
15426 Riverfront Road
Clatskanie, OR 97016

Re: **Tracer Study, Plan Review # 91-2011**
Midland Water Association, PWS ID # 4101139
Final Approval

Dear Mr. Brown:

I have received and reviewed a copy of the Disinfection Contact Time Tracer Study for the Midland Water Association, prepared by the Oregon Association of Water Utilities, who is copied on this correspondence. The study was performed on May 10, 2011. Additionally, I have reviewed supplemental information submitted by Jim Kuhns, which have satisfied the conditions outlined in the May 26, 2011 conditional approval for the tracer study. **The tracer study is approved without conditions.** Mr. Kuhns is also copied on this correspondence. The schematic for the system and study are as follows:



The results for both the reservoir and length of pipeline between chlorine injection and first user, are summarized below. Please begin using the 75 minutes for contact time for

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daily disinfection verification in your monthly surface water report that you submit to the Drinking Water Program (75 minutes = 42 minutes (contact time in reservoir) + 33 minutes (contact time in pipeline)):

41,330 gallon reservoir:

Demand Flow Leaving Reservoir = 91 gallons per minute (gpm)

Volume in Reservoir at Beginning of Test = 29,958 gallons – determined as outlined in the May 26, 2011 conditional approval for the study

Volume in Reservoir at End of Test = 36,342 gallons (calculated from the difference in flow into (175 gpm) and leaving the reservoir (91gpm) during the test)

Contact Time = 42 minutes

Approximately 4,600 feet of 4-inch pipeline (verified by the Association on 10/28/11):

Demand Flow = 91 gpm

Pipe Volume = 2,937 gallons

Contact Time = 33 minutes

I do have the following comments, regarding the study:

1. Continue to verify peak hourly demand flow at least once a year during peak use periods. The first condition of the May 26, 2011 letter (verifying peak hourly demand flow used during the study of 91 gpm is conservative of actual peak hourly demand flows) has been satisfied by the following supplemental monitoring of daily peak hourly demand flows measured at the flow totalizer after the tank and pumps. This measurement of actual peak hourly demand flows leaving the tank, produces values less than 91 gpm, during monitoring periods in July and August 2011. *(Note, that the tracer-study determined contact time of 75 minutes may be used as long as the peak hourly demand flow does not exceed 100 gpm, or 10 % greater than the 91 gpm value):*

Measurement Date	Day of the Week	Peak Hourly Demand Flow (gpm)
7/6/11	Wed.	54
7/7/11	Thu	49.4
7/8/11	Fri	51.9
7/9/11	Sat	58
7/10/11	Sun	55.8
7/11/11	Mon	51.8

Measurement Date	Day of the Week	Peak Hourly Demand Flow (gpm)
7/12/11	Tue	38.9
8/17/11	Wed	64.3
8/18/11	Thu	66.9
8/19/11	Fri	66.7
8/20/11	Sat	73.1
8/21/11	Sun	70.8
Peak Hourly Demand Value from Data Set		73.1 gpm

2. The 75 minutes of contact time may be used as long as the minimum operating level in the reservoir does not drop below 10 % of the minimum volume during the study, or 26,960 gallons.
3. Continue to correlate the pH, temperature and chlorine residual between the current monitoring point at the treatment plant, prior to the pipeline, with the actual first user after the pipeline length. The third condition of the May 26, 2011 approval letter (verifying that chlorine residual, pH, and temperature are at least as conservative as measured at the current monitoring location, after the plant prior to the pipeline, than at the actual first user, located after the length of pipe) has been satisfied by supplemental monitoring by the Association between June and October 2011. The Association may continue to monitor these parameters at the treatment plant for disinfection verification. The results of this monitoring, outlined below indicate that measuring these parameters prior to the actual first user does not produce markedly different values, which are used to determine required CT (chlorine residual multiplied by contact time) values.

Date	Plant Parameters			First User Parameters		
	Chlorine Residual	pH	Temp	Chlorine Residual	pH	Temp
6/27/11	1.00	7.2	--	0.95	7.2	--
7/25/11	0.85	6.95	--	0.80	6.9	--
8/8/11	1.05	6.90	--	1.00	6.9	--
9/14/11	0.90	6.9	--	1.00	6.9	
9/22/11	--	--	11.1	--	--	11.3
10/3/11	1.00	6.8	10.3	1.00	6.9	10.5

If you have any questions or concerns, or would like this in an alternate format, please contact me at (971) 673-0459, or james.b.nusrala@state.or.us. Your cooperation is appreciated.

Sincerely,

A handwritten signature in cursive script that reads "James Nusrala".

James Nusrala, P.E.
Regional Engineer

cc:

Jim Kuhns, Midland Water Association, P.O. Box 922, Clatskanie, OR 97016

Heath Cokeley, Circuit Rider; Oregon Association of Water Utilities, 935 N. Main Street; Independence, OR 97351