

December 3, 2012

Scott Shulda, Chief Plant Operator
City of Clatskanie
P.O. Box 9
Clatskanie, OR 97016

**Re: Tracer Study, Plan Review # 169-2012
City of Clatskanie, PWS ID # 00194
Final Approval**

Dear Mr. Shulda:

Drinking Water Services (DWS) has received and reviewed a copy of the November 15th, 2012 Disinfection Contact Time Tracer Study report for the City of Clatskanie from Brad Crement, P.E. of HBH Consulting Engineers, who is copied on this correspondence. DWS had approved the October 29th, 2012 Tracer Study Workplan on November 1st. **The tracer study is approved without conditions.** The results of the tracer study for contact time at the water system are summarized below. **Thank you for using the contact time figure of 90 minutes below for disinfection verification at the water plant in the monthly reports submitted to DWS.**

Peak Hourly Flow leaving the Clearwell and 500,000 gallon lower reservoir = 460 gallons per minute (gpm) – from earlier drawdown tests on clearwell with the clearwell pumps running

Volume of the Clearwell During Test = 18,200 gallons (7.0 feet of depth)

Volume of the Reservoir During Test = 375,000 gallons (9.0 feet of depth)

Contact Time Through Both Clearwell and Reservoir = 90 minutes

I do have the following comments regarding the test:

1. The contact time figure of 90 minutes needs to be used for peak hourly flows leaving the clearwell and reservoir of up to 506 gpm (10% over the peak hourly flow simulated during the test). If the peak hourly flows leaving either contact chamber exceed 506 gpm, the 90 minute contact time figure is invalid, and an updated tracer study at these higher flows must be conducted.

2. It is understood that there is no effluent flow meter after the reservoir, and that the City has observed that the water levels are rising in the reservoir when the clearwell pumps are operating, and thus inferring that the effluent flow from the reservoir is less than the flow into the reservoir from the clearwell. As you can tell, determining peak effluent flow is difficult without a flow meter. DWS encourages the City to continue to observe water levels in the reservoir throughout the year including during peak demand scenarios to ensure that the water level does not decrease in the reservoir when the clearwell pumps are on, so that the peak demand flow leaving the reservoir is consistent with the flows simulated during your study. DWS also encourages the City to develop a written methodology to calculate peak hourly demand flows exiting the reservoir based on water level measurements and flows into the reservoir.
3. Continue to monitor the low levels in both the clearwell and reservoir to ensure that the levels do not drop significantly (greater than 10%) below the levels simulated during the tracer study outlined above, which could result in less contact time.

If you have any questions, or would like this letter in an alternate format, please contact me at either (971) 673-0459 or james.b.nusrala@state.or.us. Thank you for your cooperation in completing the study.

Sincerely,



James Nusrala, P.E.

Regional Engineer

cc: Brad Crement, P.E., HBH Consulting Engineers, 2316 Portland Road, Suite H,
Newberg, OR 97132