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3745-9-09 **Well development and pump test.**

- (A) A public water system well shall be developed upon completion until turbidity or sand content in the well is minimal and until the maximum specific capacity is obtained to remove the native silts and clays, drilling mud or finer fraction of the filter pack.
- (1) Mechanical development shall be performed so as not to cause damage to the components of the well. Mechanical development techniques include: mechanical surging; air surging or air lifting; overpumping and backwashing; high velocity jetting; bailing; and hydrofracturing.
 - (2) With prior consultation with the district office, chemical development procedures may be used in conjunction with mechanical procedures. Chemical development techniques include using an acid or dispersant that has standard ANSI/NSF 60 certification. The director may require submission of chemical development procedures with specifications for the method, equipment, chemicals, and testing for residual chemicals.
 - (a) Dispersant may be used to disaggregate clay particles to enhance removal. Dispersant shall be immediately flushed from the well and aquifer to prevent bacterial growth in the aquifer.
 - (b) Dispersant shall be premixed and used according to the manufacturer's recommendations.
 - (c) Acid shall be used according to the manufacturer's recommendations. Proper pH shall be maintained in the borehole to ensure the effective action of the acid.
- (B) Upon completion of development of the public water system well, a pump test shall be conducted to determine the ~~stable yield and drawdown~~ stabilized yield. The flow rate shall be measured using an orifice weir with manometer, or equivalent method acceptable to the director.
- (1) The pump test classification is determined from the estimated average daily water demand of the well. Estimated average daily water demand may be determined by the director from the design pumping rate of the well. With prior consultation, the director may accept an alternative constant rate pump test that is conducted under the supervision of a hydrogeologist.

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<u>Classification</u>	<u>Estimated Average Daily Demand of The Well (gallons per day)</u>
<u>Low use</u>	<u>0 to 10000</u>
<u>Medium use</u>	<u>10001 to 100000</u>
<u>High use</u>	<u>greater than 100000</u>

An acceptable pump test for low, medium, or high use classifications is:

- (a) For low use, the pump test shall be conducted at a constant rate for a period of at least normal operation either at the peak hourly demand, or at least 1.5 times the design pumping rate if the well cannot sustain peak hourly flow;
- (b) For medium use, the pump test shall be conducted at a constant rate for at least twenty-four hours either at the peak hourly demand, or at least 1.5 times the design pumping rate if the well cannot sustain peak hourly flow;
- (c) For high use, an aquifer test shall be conducted. A step-drawdown test shall be conducted with at least three progressively increasing pumping rates. Then, a constant rate pump test shall be conducted at least twenty-four hours for at least 1.5 times the design well capacity.

[Comment:] It is recommended that a person with demonstrated competency perform the respective pump test or aquifer test.

(2) The pump test report shall include, without limitation:

- (a) Date and times of starting through ending pump test;
- (b) Pumping rate and pump setting depth;
- (c) Water level measurements from the well of the static water level and drawdown to the nearest 0.1 foot, as measured from an identified datum;
 - (i) Water level measurements shall be at these time intervals:

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<u>Time After Pump Test Started (minute)</u>	<u>Time Interval Between Measurements (minute)</u>
<u>0-15</u>	<u>1</u>
<u>15-60</u>	<u>5</u>
<u>60-120</u>	<u>10</u>
<u>120-180</u>	<u>20</u>
<u>180-300</u>	<u>30</u>
<u>300-1440</u>	<u>60</u>

(ii) An aquifer test shall include water level measurements from observation or surrounding wells.

(d) Specific capacity;

(e) Graphic evaluation on semilogarithmic graph paper by plotting the drawdown measurements on the arithmetic scale and time on the logarithmic scale;

(f) Water level measurements immediately after termination of the constant rate pump test for a period of time until the water level is essentially unchanged at time intervals of five minutes for the first hour and every thirty minutes thereafter.

(3) Stabilized yield is achieved when there is less that 0.6 foot change in water level, based on 6 hourly measurements in the last 6 hours of constant rate pump test.

(C) Samples shall be collected and analyzed from a public water system well for contaminants at the conclusion of the pump test performed accordance with paragraph (B) of this rule.

(1) A public water system well shall be sampled and analyzed for the contaminants that are listed in the appendix of this rule, "Required Analyses for Wells." The director may reduce or add to the contaminants that are listed in the appendix of this rule because of well siting, well construction, treatment, promulgated drinking water standards, or other criteria to assess whether the ground water is acceptable for human consumption.

(2) Samples that are collected from a public water system well in accordance to this rule shall be analyzed in a laboratory certified to analyze drinking water for contaminants in accordance with Chapter 3745-89 of the Administrative Code. The analytical methods shall be the same as required by the entry point to the distribution system monitoring in accordance with rules 3745-81-25 and 3745-

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81-27 of the Administrative Code and shall include all the volatile organic and synthetic organic analytes that are quantified by the laboratory for the organic analytical method.

[Comment:] "Standard ANSI/NSF 60, Drinking Water Treatment Chemicals - Health Effects, February 9, 2001, Document Number NSF/ANSI 60- 2001." This rule incorporates this standard or specification by reference. At the effective date of this rule, a copy may be obtained from "NSF International, 789 N Dixboro Road, PO Box 130140, Ann Arbor, MI 48113-0140," (734)769-8010, www.nsf.org. This document is available for review at "Ohio EPA, Lazarus Government Center, [50 West Town Street](#)~~122 South Front Street~~, Columbus, OH, 43215-3425."