
From: Busch, Stephen (DEQ)
Sent: Tuesday, June 24, 2014 9:02 AM
To: Johnson, Mark; Crooks, Jennifer
Cc: Poy, Thomas; Prysby, Mike (DEQ); Shoven, Heather; Murphy, Thomas
Subject: RE: Briefing -- Flint River for drinking water, Michigan

Finished water (plant tap) pH levels ranged from 7.1-7.7 for the entire month of May.

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From: Johnson, Mark [mailto:johnson.mark@epa.gov]
Sent: Monday, June 23, 2014 6:24 PM
To: Crooks, Jennifer
Cc: Poy, Thomas; Prysby, Mike (DEQ); Busch, Stephen (DEQ); Shoven, Heather; Murphy, Thomas
Subject: FW: Briefing -- Flint River for drinking water, Michigan

Jennifer

Here is an initial response from Joe Carpenter, a water quality engineer at the CDC Waterborne Disease Prevention Program in Atlanta. His comments focus on the pH of the finished water as a possible contributor to the reports of skin rashes. In this files that were provided, there were pH measurements for the last week of April. Are there additional data available to determination if pH fluctuations in the distribution system may correspond to the complaints?

Just looking at it from a chemical perspective, I don't see anything in the analysis that would be of a health concern. We can have a follow-up discussion with CDC staff about other constituents if that would be helpful.

Mark

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From: Carpenter, Joe (CDC/OID/NCEZID) [mailto:ccr0@cdc.gov]
Sent: Saturday, June 21, 2014 4:46 PM
To: Beach, Michael J. (CDC/OID/NCEZID); Johnson, Mark
Cc: Yoder, Jonathan S. (CDC/OID/NCEZID); Robinson, Felecia (CDC/OID/NCEZID) (CTR); Gargano, Julia Marie W. (CDC/OID/NCEZID); Sarisky, John (CDC/ONDIEH/NCEH); Blake, Robert G. (CDC/ONDIEH/NCEH)
Subject: RE: Briefing -- Flint River for drinking water, Michigan

Here is a recent article (06/12/2014) about the changes in lime addition at the Flint water plant. It might be a bit challenging to make pH adjustments quickly in the finished water if they had to make this significant lime addition adjustment. High pH from lime softening plants has been associated with consumer issues in the past. See below for a background document about lime softening and a WHO document about the health effects of both high and low pH values. Skin rashes are known to be caused by extreme pH variations in drinking water.

Hope some of this info is helpful.

Joe Carpenter

http://www.mlive.com/news/flint/index.ssf/2014/06/treated_flint_river_water_meet.html

FLINT, MI -- Workers at the city's water treatment plant have bumped up their use of lime in an effort to cut down on both water hardness and rising customer complaints.

Daugherty Johnson, utilities administrator at Flint's water treatment plant, said today, June 12, that 75 percent of raw water is now being treated with lime compared to 25 percent treatment when the city made the initial switch from using Lake Huron to using the Flint River as a drinking water source on April 25.

Background info about lime softening:

http://www.nesc.wvu.edu/pdf/dw/publications/ontap/2009_tb/lime_softening_DWFSOM41.pdf

Health Effects of pH -- WHO

http://www.who.int/water_sanitation_health/dwg/chemicals/en/ph.pdf

EFFECTS ON HUMANS

Exposure to extreme pH values results in irritation to the eyes, **skin**, and mucous membranes. Eye irritation and exacerbation of skin disorders have been associated with pH values greater than 11. In addition, solutions of pH 10–12.5 have been reported to cause hair fibres to swell (10). In sensitive individuals, gastrointestinal irritation may also occur. Exposure to low pH values can also result in similar effects. Below pH 4, redness and irritation of the eyes have been reported, the severity of which increases with decreasing pH. Below pH 2.5, damage to the epithelium is irreversible and extensive (10). In addition, because pH can affect the degree of corrosion of metals as well as disinfection efficiency, it may have an indirect effect on health.

From: Beach, Michael J. (CDC/OID/NCEZID)

Sent: Saturday, June 21, 2014 12:53 PM

To: Johnson, Mark (EPA) (CDC epa.gov)