WV TAP

WEST VIRGINIA TESTING ASSESSMENT PROJECT

The Crude MCHM Chemical Spill 10-Home Study: Resident Behaviors, Perceptions, and Residence Characteristics

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1.0 Introduction and Methods

As part of the WV TAP project Task 3, ten households affected by the crude MCHM that was spilled into the Elk River and contaminated the Charleston, WV region's drinking water were surveyed and sampled. This report presents results of interviews that were conducted as a part of the 10-home study to elicit data on water customer perceptions and activities following the chemical spill. Water quality data collected during the 10-house study are presented in a companion report.

Households were surveyed and sampled in eight (Boone, Cabell, Clay, Kanawha, Lincoln, Logan, Putnam, and Roane) of the nine counties affected by the chemical spill. Homes were visited between February 11, 2014 to February 18, 2014. No affected homes in Jackson County were visited because the Jackson County residents contacted declined participation and switched to private well water in response to the contamination incident. Jackson County had the lowest number of West Virginia American Water (WVAW) customers of the nine counties affected. A second home in Putnam County near the Jackson County line was visited in lieu of visiting a residence in Jackson County.

During each household visit, three tasks were completed:

1. Residents were interviewed by the WV TAP project team;
2. Basic chemical and physical properties (temperature, pH, chlorine residual) were determined for tap water from kitchen faucets and bathroom fixtures; and
3. Water samples were collected for detailed analyses at commercial laboratories.

Resident interviews were conducted using the questionnaire found in Appendix A of this report. Project team members completed the questionnaire while speaking with a household representative. Not all residents responded to all questions. Results shown in this document note the number of respondents for each question.

2.0 Interview Results

2.1 Demographics and Notification

The survey of the 10 homes revealed an average of 3.3 people (range from 2 to 7) in each house and the age range of the person responding to the survey was 23 to 65 years old. Children, people older than 70 years of age, or individuals who may be immunocompromised lived in two of the 10 households. All of the households learned about the 'Do Not Use' Order on January 9, 2014, the date the order was issued.

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Most of the household representatives first learned about the 'Do Not Use' Order through discussions with friends and family members (**Table 1**). The next most common method was television broadcast. Radio, Facebook, and phone alerts were less frequently cited.

Table 1. Communication Method Households First Learned about the 'Do Not Use' Order

Mode of Communication	Number of Households Responding
Word of Mouth	4
TV	3
Radio	1
Facebook	1
Phone Alert	1

Representatives from all 10 households responded to this question.

2.2 Residential Property Service Line, Plumbing System, Water Treatment, and Storage Characteristics

During house visits plumbing system components were inspected. Premise plumbing in the 10 homes was comprised of a wide range of materials (**Table 2**). Several homes visited had undergone plumbing renovations between 1986 and 2013. Of the 10 homes visited, in-home plumbing was reported to be copper pipe (5), plastic pipe (4) and a combination of plastic and copper pipe (1). None of the homes had point of entry supplemental water treatment systems. Two homes had a refrigerator water filter installed. Residents of one home stored tap water in a container in the refrigerator or on a shelf. Another household used a point-of-use filter to treat their tap water before drinking. Nine of 10 homes had electric hot water heaters and water heaters were typically nine years old with an age range of 3 to 16 years.

Table 2. Type of Plumbing System Materials Installed in Each Home

Characteristic Identified	Number of Households Responding
Single type of plumbing pipe	6
Mixed plumbing pipe system	4
Contained some plastic pipe	8
Contained some copper pipe	6
Electric hot water heater	9
Gas hot water heater	1
Refrigerator water filter	2

Representatives from all 10 households responded to each question; plumbing systems that contained plastic pipe included cross-linked polyethylene (PEX), polybutylene (PB), and chlorinated polyvinylchloride (cPVC) pipe materials.

2.3 Tap Water Odor, Taste, and Color Reports

Resident behavior and perceptions were elicited through a series of before incident / after incident questions. A tap water odor was reported by residents in nine of the 10 homes before, during, or following the January 9 "Do Not Use" Order (**Table 3**). Only three persons reported an unusual tap water color in their homes (**Table 4**). One person tasted the contaminated tap water and said the water had a

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sweet taste. None of the other people in the homes drank the contaminated tap water once the "Do Not Use" Order was issued (**Table 5**).

Table 3. Date Households Detected the Odor in their Tap Water

Date	Number of Households Responding	Odor Level
Odor never detected	1	-
6-Jan	1	3
9-Jan ('Do Not Use' Order issued)	3	3,4,4
10-Jan	1	5
11-Jan	1	4
12-Jan	1	5
13-Jan	1	4
14-Jan	1	4

Representatives from all 10 households responded to this question; Odor ratings: 1 no odor, 2 slight, 3 moderate, 4 strong, 5 unbearable.

Table 4. Date Households Detected Unusual Color in their Tap Water

Date	Number of Households Responding	Color Rating	Comments
Color never detected	7	-	-
14-Jan	1	2	-
30-Jan	1	3	-
8-Feb	1	NR	Oily film on water in sink

Representatives from all 10 households responded to this question; Color ratings: 1 clear, 2 slight, 3 moderate, 4 dark, 5 very dark.

Table 5. Date Households Detected the Unusual Taste in their Tap Water

Date	Number of Households Responding	Taste Rating	Comments
Did not taste the water	9	-	-
Date not reported	1	Not reported	Sweet

Representatives from all 10 households responded to this question; Taste ratings: 1 no taste, 2 slight, 3 moderate, 4 strong, 5 unbearable.

2.4 Plumbing System Flushing and Reported Symptoms

On average, residents flushed their plumbing systems 14 days after the January 9 'Do Not Use' Order was issued following the guidance provided by WVAW (Appendix B). Some residents flushed within 4 days of the incident while other residents waited 37 days. The most frequently reported symptoms encountered during flushing were rashes, dizziness, and eye burning). As of the date of the survey, four of the 10 persons had spoken with a doctor since the incident occurred about the medical implications of exposure. Of the 10 homes, outside individuals visited four of those homes during and following the incident, but none were exposed to tap water because those homes were restricting exposure to tap water in response to the contamination incident.

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Table 6. Symptoms Reported by Each Household Following Tap Water Exposure

Symptom	Number of Households Responding	Ratings
Rash	4	3,4,5,5
Dizziness	4	3,3,3,5
Burning	4	3,3,3,4
Nausea	3	2,3,3
Numbness	2	2,3
Memory loss	2	4,4
Vomiting	1	2
Other: Headache	3	No rating
Other: Flu-like symptoms	1	No rating
Other: Agitated	1	No rating
Other: Skin itch	1	No rating
Other: Eyes red	1	No rating

Representatives from all 10 households responded to each question; Ratings: 1 no effect; 2 slightly different, 3 moderately differently, 4 very different, 5 severely different.

2.5 Level of Tap Water Contact

As of the interviews, residents had not resumed their pre-spill water use activities. While all persons used tap water for flushing toilets before and after the incident, one person chose not to use tap water for laundry purposes. At the time of the survey, four households were not using tap water for showering and nine were not using it for brushing teeth; none were using it for drinking, cooking, or baby formula. One household had resumed using hot tap water for mixing hog feed.

Table 7. Level of Contact with the Water before the Incident and as of the Survey Date

Tap Water Use	Total Responding	Number of Households Responding	
		Before	After
Drink	10	5	0
Shower	10	10	6
Laundry	10	10	9
Flush toilets	10	10	10
Brush teeth	9	8	1
Cook	7	7	0
Animals	6	3	1
Baby formula	1	1	0

Representatives from 1 to 10 households responded to each question.

2.6 Resident Attitudes Toward Organizations and Comments

To ascertain resident opinions about the incident and organizations involved, a series of questions were asked regarding what organization they felt was the most responsible for causing the incident and their attitudes towards various agencies. Half of the persons surveyed felt that a West Virginia State Government Agency was most responsible, while some named Freedom Industries and WVAW (**Table 8**). Some respondents felt two organizations were equally responsible but were asked to select one. In

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the five instances when two agencies were named, four out of five believed WVAW bore some responsibility.

Table 8. Organization Most Responsible for the Problems of the Incident

Organization	Number of Households Responding
West Virginia Government Agency	5
Freedom Industries	4
West Virginia American Water	1

Representatives from all 10 households responded to each question.

Discussions with homeowners generally revealed residents had reduced confidence in the US Centers for Disease Control and Prevention (CDC), US Environmental Protection Agency (EPA), and State Agencies. Confidence in WVAW was eroded as well. Interestingly, residents attributed more confidence to outside consultants than any other organization.

Table 9. Level of Confidence in Organizations before the Incident and as of the Survey Date

Organization Type	Name	Confidence Rating	
		Before	After
Federal Government	CDC	4.2 ± 1.5 (7)	2.3 ± 1.2 (9)
	EPA	3.5 ± 1.8 (8)	2.1 ± 1.3 (10)
	White House	3.0 ± 1.7 (6)	2.8 ± 2.0 (6)
Water Utility	West Virginia American Water	4.0 ± 1.4 (8)	1.6 ± 1.3 (10)
State Government	State Health Department	3.6 ± 1.5 (7)	1.8 ± 1.0 (9)
	County Health Department	3.5 ± 1.9 (4)	3.1 ± 2.0 (7)
	Governor's Office	2.9 ± 1.4 (9)	1.7 ± 0.9 (9)
	West Virginia DEP	2.6 ± 1.9 (9)	1.7 ± 1.3 (10)
Nongovernmental	Outside Consultants	4.3 ± 1.6 (6)	4.7 ± 0.8 (7)

Representatives from 6 to 10 households responded to each question; Ratings represent 5 = High confidence and 1 = Low confidence; Mean and standard deviation values shown for (n) persons responding.

In addition to the posed survey questions, the interviewer captured comments made by the residents about the spill and its aftermath. These comments are paraphrased and summarized in **Table 10**.

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Table 10. Comments by Residents

Home	Resident Comments
1	County was not in first official notification; resident called WVAW and was told incorrectly they were not in the affected area. Had to call for bottled water, feels County was forgotten. No confidence in Bureau of Public Health. Did not have confidence in the County Health Department in the beginning as they relied on WVAW and others in saying the water was safe, but then changed position and made independent comments, gained respect. State should have been checking chemical tanks all along. Wrote to the White House, 60 Minutes, Rachel Maddow and local weatherman; no response initially from anyone but Maddow then gave some coverage. Government handled the situation horribly and relied too much on WVAW and they knew the water wasn't safe. Government screwed up and said water was safe so no FEMA emergency money is available. No confidence in Obama administration, not mentioned in State of the Union address. Feels like this is the 1800s or Third World. West Virginia has been ignored.
2	Baby boy 8 months old went to the emergency room for throat rash as he was very hoarse. Water was brown when flushed on Jan 30.
3	City did not use emergency alarm system; felt City should have done so as that is what it is for. Female resident got nosebleed walking to work along the Elk River on the morning of January 9. Residents are long-term users of ceramic filter for all water ingested. Did taste some water at a restaurant on January 9 around 4:30 pm before 'Do Not Use' Order and thought it tasted off so they did not drink it, thought the Coke lines and water lines were mixed in the drink machine. Felt disoriented and left town for the weekend after the event occurred and shut off the water to the house. The smell from the water still comes and goes when running taps. High regard for Kanawha County Health Department. Feels State is responsible for spill as it is their role to regulate industry and keep people safe.
4	Resident flushed the house on January 18. Smelled sweet odor 3 to 4 days before January 9; headaches during flushing. Washed berries in tap water prior to January 9 and felt sick after eating them. Favorable opinion of Kanawha County Health Department.
5	Opinion of Kanawha County Health Department improved as the event progressed.
6	Smelled sweet odor in water 3 weeks prior to January 9; was licorice odor, now is lighter and sweet. After showering skin felt soft and silky like lotion that was not completely washed off. WVAW should have alarm system to detect when river water is contaminated; strong smell at first flush of taps each day. "No one in politics is doing anything".
7	Homeowner worked with MCHM in 1980's and remembers the smell in the water as that same smell. Odor began on the third day, was unbearable. Did not shower or wash clothes for first two weeks after spill as clothes smelled of licorice. "Politics rules everything", would have preferred to receive call directly, not hear from news reports. Favorable opinion of Kanawha County Health Department.
8	District water agency that supplies WVAW was excellent, provided lots of information. Resident said that water is not piped from WVAW but a tank is filled periodically from a truck. Thought they were spared as it took five days before smell occurred in their water.
9	Use tub hot water tap to mix hog feed in the morning; still have odor in water on first flush.
10	Felt faint after showering after flushing, lungs felt tight, wife had chemical burns after shower. House at end of system and had no odor until Jan 13, thought they had avoided contamination.

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3.0 FINDINGS

Interviews with representatives of the 10 households affected by the tap water contamination incident revealed several key findings:

1. The majority of the residents learned about the 'Do Not Use' Order by word of mouth (4 of 10 homes) and television broadcasts (3 of 10 homes), followed by Facebook, radio, and phone alert. All of the residents that were interviewed had heard about the 'Do Not Use' Order on January 9.
2. Homes had a variety of plumbing materials including copper and a variety of plastics; nine of 10 homes had electric hot water heaters.
3. None of the homes had whole house water filters (point of entry water treatment), and only one had a treatment system after the tap. Two homes had refrigerator water filters.
4. Residents in one of the 10 homes never detected any odor in the water. The other nine homes reported moderate to unbearable odor at some point on or after January 9.
5. Three of the 10 homes noted some color change in their water. These color changes might have been a result of system flushing.
6. Nine of the 10 homes reported not tasting the water once the 'Do Not Use' Order was issued; in the home where one resident did drink the water he reported it as sweet tasting.
7. All residents flushed their plumbing, on average 14 days after the 'Do Not Use' Order was issued. One resident first flushed his system 37 days after the incident. Seven of the 10 respondents reported rashes or burning eyes associated with flushing.
8. All homes used water for toilet flushing before and throughout the event. At the time of the interviews four homes were not using water for showering and nine were not using tap water for teeth brushing. None were using tap water for drinking, cooking, or making baby formula; only one home used tap water for watering farm animals.
9. Prior to the contamination event, half of the households did not use tap water for drinking. Two of 10 did not use tap water for brushing teeth and three of 10 did not use tap water for cooking.
10. Half of the respondents felt that a West Virginia Government Agency was responsible for the contamination event for lack of oversight of industry. When more than one responsible party was named, WVAW was named in four instances.
11. Where households had an opinion of a particular agency prior to the spill, they generally reported a lack of confidence in that agency after the spill. Kanawha County Health Department was named specifically by half of the respondents as an agency in which they had confidence. Outside consultants were also identified as holding resident confidence.

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APPENDIX A. Ten Home Study Questionnaire

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CONSENT FORM FOR PARTICIPATION IN WATER ANALYSIS

RELATED TO THE MCHM SPILL

Corona Environmental Consulting, LLC has been contracted by the State of West Virginia to undertake a study of homes in Charleston, WV to assess presence and levels of 4-Methylcyclohexanemethanol or MCHM that may be present in tap water in homes. This study includes sampling domestic water within the home and interviewing household members. Observation of obvious plumbing in the homes will be noted.

Corona scientists are working with Dr. Andrew Whelton from the U. of South Alabama who has been involved in the incident from the earliest stages. The goal of this sampling and testing is to determine if MCHM as well as other chemicals that may be present in the water and at what levels.

Corona Environmental has contracted with two independent certified drinking water laboratories to conduct these analyses. Corona Environmental will collect the samples and ship them to the contracted labs. Corona samplers will conduct a brief interview with homeowners and/or those living in the home to understand: the water usage pattern prior to the event, water quality changes if any noted by persons living in the homes, and a short survey on household plumbing. **Homeowner/resident names in this study will be kept confidential.** By signing this consent form the homeowner releases the State of West Virginia, the Contractor, and its agents from liability.

Address: _____

Signature of homeowner: _____

Signature of interviewer: _____

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West Virginia Drinking Water Survey Questionnaire

1. Name of person(s) interviewed:
2. Address:
3. Phone: email:
4. Number of people living in the household (ages, sex):

5. When did you find out about the drinking water being contaminated?

_____

6. Where did you hear about the incident first?
   a. TV b. Newspaper c. Radio d. Word of mouth
   e. Other:_____
7. Do household members regularly drink tap water? If no, do residents drink bottled water or use home water treatment devices (describe)?

Aesthetic

8. When did you first notice the water odor and describe the types? Has the odor(s) changed?

_____

   a. Rate the strength of the water odor from 1-5
   (1 no odor, 2 slight, 3 moderate, 4 strong, 5 unbearable)

DAY:_____ 1 2 3 4 5

DAY:_____ 1 2 3 4 5

DAY:_____ 1 2 3 4 5

DAY:_____ 1 2 3 4 5

9. Did you notice any coloration in your water? Has the color changed?

_____

   Rate the intensity of the color from 1-5 (1 clear, 2 slight, 3 moderate, 4 dark, 5 very dark)

DAY:_____ 1 2 3 4 5
DAY:_____ 1 2 3 4 5
DAY:_____ 1 2 3 4 5
DAY:_____ 1 2 3 4 5

If you noticed any changes in taste, when did first occur? Has the taste changed?

_____

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Rate the strength of the taste from 1-5 (1 no taste, 2 slight, 3 moderate, 4 strong, 5 unbearable)

DAY:_____	1	2	3	4	5
DAY:_____	1	2	3	4	5
DAY:_____	1	2	3	4	5
DAY:_____	1	2	3	4	5

10. Do you have any children, people older than70 years of age, or individuals who may be immunocompromised in the household:_____

11. Describe your level of contact with the water before the incident? After the incident?
    a. Drinking: _____
    b. Showering/bathing: _____
    c. Washing clothes: _____
    d. Brushing teeth: _____
    e. Cooking: _____
    f. Watering animals: _____
    g. Making baby formula: _____
    h. Flushing toilets:_____

12. Have you felt differently after contacting the water?_____Yes/No_____
    (1 No affect; 2 slightly different, 3 moderately differently; 4 very different, 5 severely different)

i.	Nausea:	1	2	3	4	5
j.	Vomiting:	1	2	3	4	5
k.	Diarrhea:	1	2	3	4	5
l.	Dizziness:	1	2	3	4	5
m.	Rash:	1	2	3	4	5
n.	Numbness:	1	2	3	4	5
o.	Memory loss:	1	2	3	4	5
p.	Other: _____	1	2	3	4	5

_____
_____

13. Number of people (sex, age) visiting the household during the event if known:
14. Length of visit(s) if known.
15. What did visitors experience, if anything from air or water exposure?
16. Who/what organization do you feel is most responsible for the problems this incident?
17. Have you talked with your/a medical doctor since the event occurred? Yes/No

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Information on Premise Plumbing

18. What type of pipe is installed in your –DRINKING WATER– plumbing system?
    a. Copper
    b. PEX
    c. cPVC
    d. PVC
    e. Other:_____

19. When was your plumbing system installed or last renovated?
    _____

20. Have you flushed out your entire house, if so when? Date/ Time_____

Observations of Interviewer

Entrance of piping/material from meter into the house:

Is water treated after it leaves the service meter?

Whole house filter: Pitcher filter:

Fridge filter: Stored in container in fridge or on shelf

Materials noted in premise plumbing by interviewer:

Hot water heater: Type (electric, gas) Operation (on demand, continuous, intermittent)

Piping material in and out of heater:

Age of heater (if known):

Kitchen faucet: Separate cold and hot or blended, aerator, treatment device (ask homeowner to remove)

Level of confidence in agency before and after incident: Rate 5 high -1 low
CDC
USEPA
STATE DEP
STATE HEALTH DEPT
COUNTY HEALTH DEPT
WV AW
GOVERNOR'S OFFICE
WHITE HOUSE
OUTSIDE CONSULTANTS

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APPENDIX B. WVAW Flushing Guidance

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HOW TO FLUSH YOUR PLUMBING SYSTEM

WEST VIRGINIA AMERICAN WATER

Following are step-by-step procedures customers can use to flush their plumbing system. To protect the health and safety of our communities, we recommend that you read carefully and follow the steps for flushing. Thank you for your cooperation. **NOTE: After flushing, your water filters need to be replaced. If you have any point of entry water treatment system such as a water softener or filter, please refer to "How to Flush Plumbing Appliances and Faucets."**

West Virginia American Water will be offering residential customers a credit of 1000 gallons, which is more than what will likely be required to flush the average residential home. The average residential customer uses approximately 3,300 gallons per month.

How to flush your plumbing system

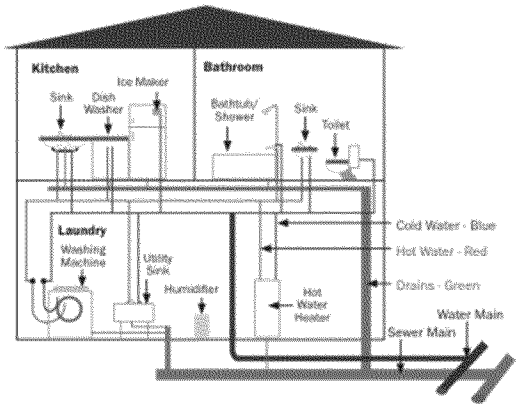
Please complete these steps in the order set out below. Finish each step completely before moving on to the next step.

1. **Flush ALL hot water taps for 15 minutes**
   Begin the flushing procedure by opening the hot water taps in your bathroom(s). Open ALL hot water lavatory (sink) fixtures, hot water bath fixtures, and any other hot water fixtures, such as kitchens, wet bars, etc. **Run these hot water fixtures for at least 15 minutes. Shut water off after 15 minutes.** After you have flushed each hot water faucet for 15 minutes, your hot water heater will be safe for use.

2. **Flush ALL cold water taps for five minutes**
   Once the hot water tank and hot water piping have been flushed, open ALL of the cold water fixtures, flush each toilet at least one time. **Run these cold water fixtures for at least five minutes. Shut water off after five minutes.** This does include the water in your refrigerator water dispenser.

3. **Flush ALL remaining faucets and appliances**
   (Before starting step 3, please see **How to Flush Plumbing Appliances and Faucets** for more information.) Open any remaining fixtures such as hose bibs, external faucets or fixtures not used for drinking for at least five minutes to finish the plumbing system flushing. Take additional steps to remove water from other appliances. See **How to Flush Plumbing Appliances and Faucets** for more information. This includes:

   - Ice makers
   - Dishwashers
   - Washing machine
   - Humidifiers
   - Continuous Positive Airway Pressure (CPAP)
   - Oral, medical or health care devices
   - Baby formula, food and drinks made with water during DO NOT USE
   - Water filters
   - Water softeners
   - Reverse osmosis units



Any lingering smell, which is expected, is not a health issue.

For more information: Please contact our 24-Hour Customer Service Center at 1-800-685-8660 or visit our website at **www.westvirginiaamwater.com**.

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HOW TO FLUSH PLUMBING APPLIANCES AND FAUCETS

WEST VIRGINIA AMERICAN WATER

Once you've flushed your hot and cold water faucets, be sure to take these additional steps to flush plumbing appliances. To protect the health and safety of our communities, we recommend that you read carefully and follow the steps for flushing. Thank you for your cooperation.

- **Ice makers**
  If you have an ice maker in your refrigerator, first throw away all ice and then:

  If you have a filter on your ice maker:
  Some refrigerators, which have ice makers, also have filters on the small water line that feed the ice maker. If you have or use filters on your ice maker, you want to replace the filter **AFTER** flushing your refrigerator's ice maker. These filters require routine replacement. This would be a good time to replace the filter to ensure that the water line to the ice maker is completely flushed. Some refrigerators also provide filtered cold water. Check to make sure that you have replaced any filter **AFTER** flushing that is associated with the cold water supply. Then flush cold-water dispenser for five minutes.
- After flushing all of the other plumbing, let the ice maker container fill up completely and discard this ice and clean the container before replacing. If you have more than one refrigerator make sure you perform the same procedure on those units as well.
- **Dishwashers and washing machines-**
  Dishes and clothes that were washed during the DO NOT USE order should be rewashed. After flushing hot water pipes and water heater, run dishwasher and washing machine empty one time.
- **Humidifiers, CPAP and other devices**
  Throw away any water used in humidifiers, Continuous Positive Airway Pressure (CPAP), oral, medical or healthcare devices, and rinse the device with clean water.
- **Baby formula, food or drinks made with water during the DO NOT USE**
  Be sure you have thrown away any baby formula or other foods prepared with water on the days of the DO NOT USE. This includes drinks like Gatorade made with powder or concentrate.
- **Water filters**
  Clean or change your water filter, or contact the filter manufacturer for more details.
- **Water supplies for pets**
  Pets need clean water too. Be sure to empty all water bowls, bottles, or other water supplies for your pet. After flushing your water system, wash the pet bowl, bottle or other water supply. Then refill with tap water.
- **Point of entry/point of use devices (this may not apply to all customers)**
  If you have a Point of Entry water treatment system such as a water softener or filter, which all of the home's water passes through before it enters the main plumbing system, you should consider the following general guidelines before completing your household plumbing flushing.

(Continued on page 3)

For more information

Please contact our 24-Hour Customer Service Center at 1-800-685-8660 or visit **www.westvirginiaamwater.com**.

HOW TO FLUSH PLUMBING APPLIANCES AND FAUCETS

WEST VIRGINIA AMERICAN WATER

- **Water softeners:** Household water softener, which uses a natural or synthetic resin material to exchange sodium for calcium and magnesium present in the water, should be manually regenerated before flushing your plumbing system. This will ensure that the softener resin has been backwashed and cleaned before flushing procedures begin. If you are unsure of how to manually initiate a regeneration cycle, refer to your softener owner's manual or call you equipment supplier for assistance.
- **Sediment Filters:** Household water filters usually fall in two basic categories:
  - Pressure filters, which can be backwashed to clean
  - Cartridge filters, which have a replaceable element or cartridge

  If your home has a pressure filter that can be backwashed, you should initiate a manual backwash of the filter before proceeding with, and after completing, the flushing procedures. If you have a whole house cartridge filter system, you should replace the cartridges after completing the flushing procedures.
- **Point of use filters/treatment:** If you have or use Point of Use filters, which are typically attached to your kitchen faucet you should replace the filter before using the faucet-connected unit. These filters require periodic replacement anyway so this would be a good time to do this.
- **Reverse Osmosis:** Reverse Osmosis drinking water treatment systems often have pre-filters, which you may want to replace before flushing the RO System. However the actual Reverse Osmosis membrane module should not require replacement. If the manufacturer of the membrane suggests that you replace this part of the system you should ask them to give you the specific reasons why.

For more information

Please contact our 24-Hour Customer Service Center at 1-800-685-8660 or visit our website at **www.westvirginiaamwater.com**.

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