



American Water Works  
Association

IndianaSection

Small Systems Committee  
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# FYI - Small Systems

December 2016

## FYI

Hello all and welcome to winter! Included in this Newsletter is an updated organization chart for The Drinking Water Branch and the current Wastewater Inspection Map. The map has all the phone numbers and emails for the inspectors. Also there are informative articles Backflow Cross Connection Audits and Emergency Response Planning. New to the Newsletter are two fun crosswords! Please enjoy, and do not hesitate to email us with potential articles for our future newsletters.

The Small Systems Committee wishes you all a healthy and prosperous New Year!

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## FYI FROM THE SECTION CHAIR

By John Seever, Indiana Section AWWA Chair

As I sit and write this article for the FYI Small Systems newsletter, I think back to my first article where I stated we would have a whirlwind year with many activities and opportunities for member engagement. Boy, oh boy, was that ever an understatement! Between District meetings, WFP events, Water Quality Technical Conference and many other events, there were many opportunities to come together as a Section for learning and networking. Together our members and volunteers accomplished much in this year that is quickly coming to a close. Thank you to everyone for all you do for our industry and Indiana Section every day. Your efforts do not go unnoticed.

I look forward to welcoming all of you to our 109th Annual Conference in Indianapolis, January 30-February 2, 2017. Our program committee has put together a robust program with topics sure to apply to everyone. Registration information is available on our website.

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## INDIANA SECTION AWWA 109TH ANNUAL

Make plans now to join us in Indianapolis for our 109th Annual Conference. The event will be held January 30-February 2, 2017 at the Marriott Hotel in downtown Indianapolis. The program committee has put together an informative and interesting program that we are excited to share with all of you.

Registration is open for all attendees, including exhibitors. For complete registration information, please visit our website at [www.inawwa.org](http://www.inawwa.org). Reminder...if you are an utility attendee and have never attended our show, registration is free!

Hotel registration is open on the Marriott's website (<https://aws.passkey.com/event/14994249/owner/2211/home>). Rooms are \$139/night and parking is available at an additional cost.

We look forward to seeing everyone at the Marriott Hotel!

## BACKFLOW CROSS CONNECTION AUDITING

Backflow Cross Connection Auditing is beneficial for customers and businesses alike. Although time consuming, one will come to realize it is a good task to do. Other important information can also be obtained during the backflow auditing process.

Educating customers about backflow during the audit process is beneficial to both the customer and the utility company. Customers can be educated on how their device works and the possibility of contamination when the backflow isn't working properly.

Much information can be obtained during backflow auditing. Compiling information into a spreadsheet makes it easy for anyone in the present and future to know what is going on at a certain location. Taking a picture of every device at locations is also beneficial. This way if any questions arise, the photo is documented and easily used as needed for reference.

There are many questions we could ask ourselves before starting a backflow audit:

1. Do we know how many backflows are in your district?
2. Do we know how many irrigation systems are in your district?
3. Do we know how many fire services are in your district?
4. Are these fire services being billed?
5. Do we know who needs a backflow?
6. Do we know where all of our backflows are located?
7. Do we know if the backflows are being tested?
8. Are those results being properly recorded and sent to your district for record keeping.

While performing backflow audits, many things can be found. One can find devices that they didn't know were there at all. Find devices that have been replaced or removed without proper documentation. Serial numbers could be an issue if they don't match testing records or they may have never been recorded at all. Inappropriately installed devices could also be found. We could also find devices that have never been tested at all.

Auditing lawn irrigation back flows is very important. Irrigation backflows are the most difficult to audit and inspect. They are easily missed and we are relying on irrigation companies to follow IDEM (Indiana Department of Environmental Management) rules and regulations and send in reports from backflow testing. If these companies do not follow these rules, then the reports aren't properly completed and information doesn't get sent to the homeowner or water utility. Furthermore, while performing these audits on irrigations one may find irrigation lines that you do not have any record of or worse they have no backflow device installed.

Other lines that can be found during an audit, are fire service lines. These are lines that are utilized for larger buildings and multi-unit building for fire protection. (ie..internal sprinklers) This is a great opportunity to look at the fire service backflow and verify the following:

1. Is the backflow installed correctly?
2. Have any changes been made to alter the backflow such as a bypass installed or any domestic lines connected?
3. Make sure detector meters is installed properly and is correct size for the fire service system. A detector meter tells a utility if any water has been used for fire service.
4. Verify the size of the fire service is being correctly billed.
5. Find leaking fittings on the system which could increase the districts non-revenue water.

Backflow Cross Connection Auditing is beneficial for utilities and customers alike. Whether it is educating the customer or discovering new things during the audit, backflow testing is important to both parties.

## WINTERIZING TIPS FOR WATER UTILITIES

The cold winter air is already hitting us in the face. The question is: Are you prepared for the bitter cold weather that can cause you so many problems? The purpose of this article is to get you brainstorming on what areas you might have in your water system or community that could be potential problems or risk due to the cold weather.

As the weather turns colder, you need to prepare your system. Here are a few areas that could be checked in your community and water utility, we call it our winterizing checklist:

- Start working on your winterizing checklist before the cold weather sets in. Set a deadline for when this checklist should be completed.
- Be sure your employees have appropriate cold weather gear and equipment if they will be working out in cold weather conditions.
- Check for hydrants that do not drain properly. You may have notes on these from your flushing program; if not, it may take awhile to check all of your hydrants so start early. Once you have identified the problem hydrants, you need to pump them down at least 3' below ground level. You will want to check these problem hydrants a couple of days after pumping them down to see if water is leaking by the main seat and filling the barrel of they hydrant back up.
- Valves located, raised (if needed) and exercised (if possible) to ensure they work properly when needed.
- Examine and weatherproof booster stations. Check heaters, set thermostats, seal holes in building or pit walls, check that drains or sump pumps are working properly.
- Check any areas in which you may use heat tape. You will want to make sure that the heat tapes are working properly. IF the heat tape is 3-4 years old you may want to strongly consider replacing that heat tape.
- Does your community have park restrooms or water fountains that need drained or winterized?
- Your water tower is one of your biggest assets and should be a concern during the winter months. You can vary the water level in your tank on a daily basis to keep from having major freezing problems. If your tank overflows on a regular basis, you need to correct the problem before the hard winter gets here. (A water tank can collapse with excess ice build-up.)
- Do you have an auxiliary heat source available in your well house in case power would go off for more than a couple hours?
- If you have any machinery that stays out in the weather or is in an unheated garage, be sure to check antifreeze strength, it should be down to at least -25 degrees F.
- Winterize mowers and equipment that will sit all winter. Gas stabilizer in October makes things so much easier in April.
- Check insulation and weather-stripping on all facilities in order to reduce the cost of heating those spaces.
- Inspect your facilities for small openings where mice and other small animals could find their way into the facility. In addition to the health concerns from their droppings, mice can cause a lot of damage.
- Check pits for leaks, insulators, and conduct an overall inspection.

### SECURITY

- Check your pump houses to make sure there is an adequate heater with a thermostat to secure accessways with chains and/or locks.
- Clear fences and make sure they are properly maintained.
- Close and lock gates.
- Make provisions for proper snow removal if access is needed during the winter.
- Make sure any security or freeze alarms are all operational.
- Remind your seasonal customers of some winterizing tips for their home when they call in for their seasonal disconnect. (Draining of water line, *if they don't have hot water heat of course*, turn back thermostat on furnace and hot water heater.)
- Find out an approximate return time of your seasonal customer to be verified with a phone call. Just in case of a problem you should see if they will give you a phone number so they can be contacted in case of an emergency.

### HYDRANTS

- Flush, grease, and check to be sure they are draining properly.
- Locks should be lubed, silicone, or protected from moisture in order to operate easily in the freezing weather.

### WELLS and PUMPING EQUIPMENT

- Check your pump houses to make sure there is an adequate heater with a thermostat to maintain enough heat in the building so the discharging piping and any sensing lines in the building will not freeze.
- If there is a vertical turbine pump in the pump house, there will be a small amount of water trickling out of the stuffing box, which is normal. You must make sure the water has proper drainage away from the pump house.

(Continued on page 4)

## WINTERIZING TIPS FOR WATER UTILITIES (continued from page 3)

- On a submersible pump, you want to maintain proper heat in the building so when the pump is off, it will not freeze.
- For wells and pumps on pitless adapters, you must ensure the wells are covered properly and protected against snow, hail, and ice getting in them, yet allowing them to be vented to atmosphere.
- If there is a pit for booster pumps or check valves, ensure the top is sealed as with the pitless adapters.
- Mud pumps used for dewatering leaks should be serviced and ready.
- To avoid accidents with snowmobiles and snow plows, make sure that if you have test wells or wells with pitless adapters, they are very visibly marked so they may be located easily in deep or drifting snow.
- When spring arrives, do not forget to shut off your heaters to prevent overheating and save fuel.

### STORAGE TANKS

- The leading of tank freeze ups in Indiana are a lack of circulation and operator awareness.
- Ice formation when water sits in a tank long enough to have heat transfer through the tank wall lower the temperature to freezing. Smaller tanks are more susceptible to freezing as their surface area to volume ratio is lower. A 100,000 gallon elevated tank has approximately 30 gallons of water stored for every square foot of surface area, while a 1,000,000 gallon elevated tank has approximately 68 gallons per square foot. The more steel surface area there is per gallon, the faster heat will transfer. The same relationship applies to pipes. A 4-inch diameter pipe has 0.62 gal/sq.ft., while a 24-inch diameter has 3.75 gal/sq.ft. That is why a small pipe without circulations will freeze solid much faster than a large one. There is much less water to freeze and the heat transfer rate is much higher.
- Groundwater systems have a major advantage as the incoming water is around 46-48 degrees F and adds heat to the tank every time it is filled. As a rule of thumb, if the volume of a tank can be turned over at least every two days during the winter, freezing should not be a concern for a groundwater system. Surface water supplies have a more difficult time as for several months they are pumping water that is 33-34 degrees F and will freeze quickly if circulation is not adequate.
- Make sure any water towers or ground storage tanks have their sensing lines properly insulated or heat taped to prevent false readings and to allow the water to be turned, keeping it fresh.
- Adjust pump cycles as needed to ensure that water circulates frequently each day. Demands in the winter are lower, so the pump operating levels may need adjustment.
- Consider changing filling operations to lower demand times. This ensures most of the new warmer water enters the tank first instead of being used directly to meet system demands.
- Consider reducing overall tank volumes. As long as the fire flow minimum storage volume is maintained, the tank volume can usually be reduced without a noticeable effect on system pressures.
- Insulate fill pipes and use heat tape where practical. Without adequate circulation, the fill pipe will freeze before the tank due to its high heat transfer rate.
- Install temperature alarms on the fill pipe and riser. These can be tied into your control or SCADA system to warn of impending freezing.
- Use warmer water sources where possible. If you have dual sources, try to use ground water instead of surface water during the winter.
- If altitude values are used on multiple tank systems, they should be serviced routinely to ensure proper operation.
- For worst cases, consider installing a recirculation system. These are commonly found on industrial tanks that are only used for fire protection. A new municipal tank built for future service demands could also temporarily have this problem, as can school water supply systems. Recirculation systems are effective, but require close monitoring to ensure they work properly.
- Most importantly, be sure that your control system provides a continuous reading of tank levels. The old fashioned circular chart recorders work fine, as do the more modern computerized telemetry. Paying close attention to this data will help to identify circulation concerns.

### BACKFLOW

- The best way to prevent freezing on an irrigation system is to have the assembly removed for the winter months then re-install and test the assembly in the Spring when it is warmer. Another option is to turn off the shut-off valve and drain the assembly by opening the test cocks.
- Whether your assembly stays in use for the winter, be sure the backflow cover fits securely to the ground to prevent air infiltration. Check the cover for any cracks, holes, splits, etc.
- Cover the assembly with insulation inside the enclosure.
- If electricity is available, install a damp rated heat tape around the assembly and piping inside the cover.

*(Continued on page 8)*

## EMERGENCY RESPONSE PLANNING

Safe and reliable drinking water is vital to every community. Emergency response planning is an essential part of managing a drinking water system and is a requirement of the Emergency Planning and Community Right-to-Know. Water utilities serving more than 3,300 persons must conduct a vulnerability assessment as required under the Bioterrorism Act, certify to the EPA the assessment has been completed, submit a copy of the assessment and show that the system has updated or completed an emergency response plan outlining response measures if an accident occurs. Information on this is available through the EPA.

Emergency Response Planning is a process where water system staff and managers look at the vulnerabilities of the water sources and systems, make improvements, and establish procedures to follow in an emergency. It is a plan that relies on people to work together in an emergency situation. People involved can be your own staff, police and fire departments, the public, local officials, civil defense, local emergency response teams and businesses within and out of your community depending on the type of emergency you may have.

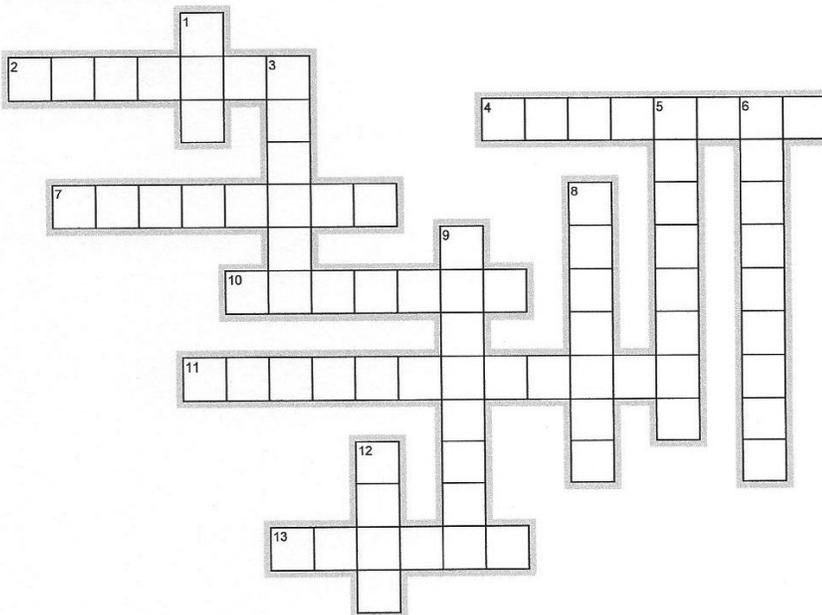
Most public drinking water systems have had routine operating emergencies such as pipe breaks, pump malfunctions, minor contamination, and power outages. These are manageable if you have an emergency response plan that can be put into action quickly. More serious emergencies may result from intentional acts of vandalism or terrorism, chemical spills, floods, earthquakes, windstorms, droughts, waterborne diseases, cross contamination, fire and cyber attacks.

With an effective plan you can address these issues quickly and initiate effective response action to protect the health of water customers. Having a chain of command defines lines of authority and responsibilities for system personnel which speeds up response time. This eliminates confusion which is crucial in an emergency situation. Effective communication is a key factor to the process of how an Emergency Response Plan works. In order to make the plan work it requires practice drills. Drills should be practiced on the different levels of emergencies in order to familiarize individuals of what to do in the event of a real emergency. Practice drills will get you more relaxed so you are less likely to tense up or even worse have the feeling of "what do I do" in a real situation.

Drinking water reservoirs and river intakes are particularly vulnerable to spills and accidental releases from private and public discharges. Nearby roadways, railroads, boats, businesses, site developments, farm ground that uses inappropriate amounts of pesticides and fertilizers, improper household disposal of hazardous wastes and illegal dumping are just some of the examples of potential contamination to your water source that can cause sudden and costly damage to your system and put the public at harm. Having a response plan gets you prepared and in compliance should such a situation happen.

### Collection System I

Barbara Smith



EclipseCrossword.com

### Across

2. Must protrude 18" above the top of the excavation.
4. 2.0 ft/sec is the minimum scouring \_ normally used for sanitary collection lines.
7. Is equivalent to 1.34 horsepower
10. Chlorine is \_ than air
11. Bad joints is the most common reason for this
13. Spring blades are used with a power \_.

### Down

1. A bullet shaped object passed through a force main
3. In sewers this is mechanically removed by high pressure jets
5. The most common chemical used for odor control in sewers
6. Schedule 40 refers to pipe wall \_.
8. Is a mechanical means to remove material from a sewer
9. If the discharge valve on a centrifugal pump is partially closed the amperage will \_, discharge head will decrease.
12. Employers must provide employees with information about possible health effects from contact with hazardous material. It is called "right-to-know" this document provides that right.

## EMERGENCY RESPONSE PLANS—PROACTIVE COMPLIANCE OR ANOTHER PAPER WORK DRILL?

Maintaining a safe and secure workplace in the 21<sup>st</sup> century is more than just good business practice, it's the law. The Public Health Security and Bioterrorism Preparedness and Response Act of 2002 require most water utilities to conduct vulnerability assessments and to have an Emergency Response Plan (ERP). To date, most large and medium sized utilities have completed vulnerability assessments and ERPs while small systems have until the end of the year to certify that you have amended your emergency response plan to address counter terrorism issues. Is yours compliant?

Emergency Response Plans (ERPs) are documented plans that describe the actions water utilities would take in response to major incidents or events. These events could include: acts of terrorism, major weather related disasters, catastrophic incidents resulting in mass casualties, major damage or disruption to your utility or other critical infrastructures. The common thread of all these events is the inability or lack of resources a utility or critical infrastructure would have to adequately respond to the situation. As a result, these organizations must look outside for help and assistance during the crisis and consequence management phases of a major emergency or incident.

USEPA has established eight core elements of a compliant plan, these include:

1. Water utility system specific information
2. Individual roles and responsibilities
3. Communication procedures – answering questions surrounding the incident that address who, what, when, where and why
4. Personnel safety
5. Identification of alternate water sources
6. Replacement equipment and chemical supplies
7. Property protection
8. Water sampling and monitoring

ERPs must also incorporate the results of the utility's Vulnerability Assessment (VA). For small systems, VAs had to be completed by the 30<sup>th</sup> of June. Signed certifications of ERP completion will need to be mailed to the USEPA and IDEM.

Other federally mandated plans similar to the ERP include OSHA's Emergency Action Plans (EAPs), Process Safety Management or Hazardous Waste Operations and Emergency Response (29 CFR 1910.119 & 29 CFR 1910.120). All of the OSHA required plans or programs are site specific documents that are retained on location and address emergencies that the employer may reasonably expect in the workplace. For example, the EAP must include (at a minimum) the following elements:

1. Escape procedures and escape route assignments
2. Critical operations shutdown procedures
3. Procedures to account for all personnel
4. Rescue and medical duties
5. Means of reporting fires and emergencies
6. Identification of responsible persons for further information

Although there are neither deadlines nor submittal requirements for OSHA's EAP, all newly hired employees and contractors need to be briefed on the plan's details. Copies should also be posted or made available upon request by those affected. Detailed guidance concerning EAPs can be found in 29 CFR 1910.38.

The route to attaining compliance with USEPA's emergency response program requirements can take a variety of paths. Some will choose to work with their county Emergency Management Agency (EMA) or their county Local Emergency Planning Committee (LEPC). Both of these community level organizations are mentioned in the EPA's strategic plan as: "key response agencies that EPA will work with to respond to potential terrorist actions against water utilities. EPA will also assist local government (including EMAs and LEPCs) to understand site security hazards and to prioritize risks with chemical facilities" (*USEPA Strategic Plan, 2002*).

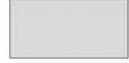
Outsourcing the development and implementation of these or other plans by using consultants is another route to achieving regulatory compliance. Technical expertise, timeliness, experience and cost effectiveness should be some of the considerations when choosing the best course to take.

The ERP is a key component of the enhanced security process. It's your play book and it will only be as good as the information that has been incorporated into it. ERPs need to be tested through table top or more extensive full scale exercises to see if what has been written will indeed work. Most importantly, a well written functional ERP can help set the stage for coordinated procedural activities and long term cost effective improvements rather than near term quick fixes.

*Steve Pappas, CUSA*

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# OWQ Wastewater Inspector Areas 2016 - 2017

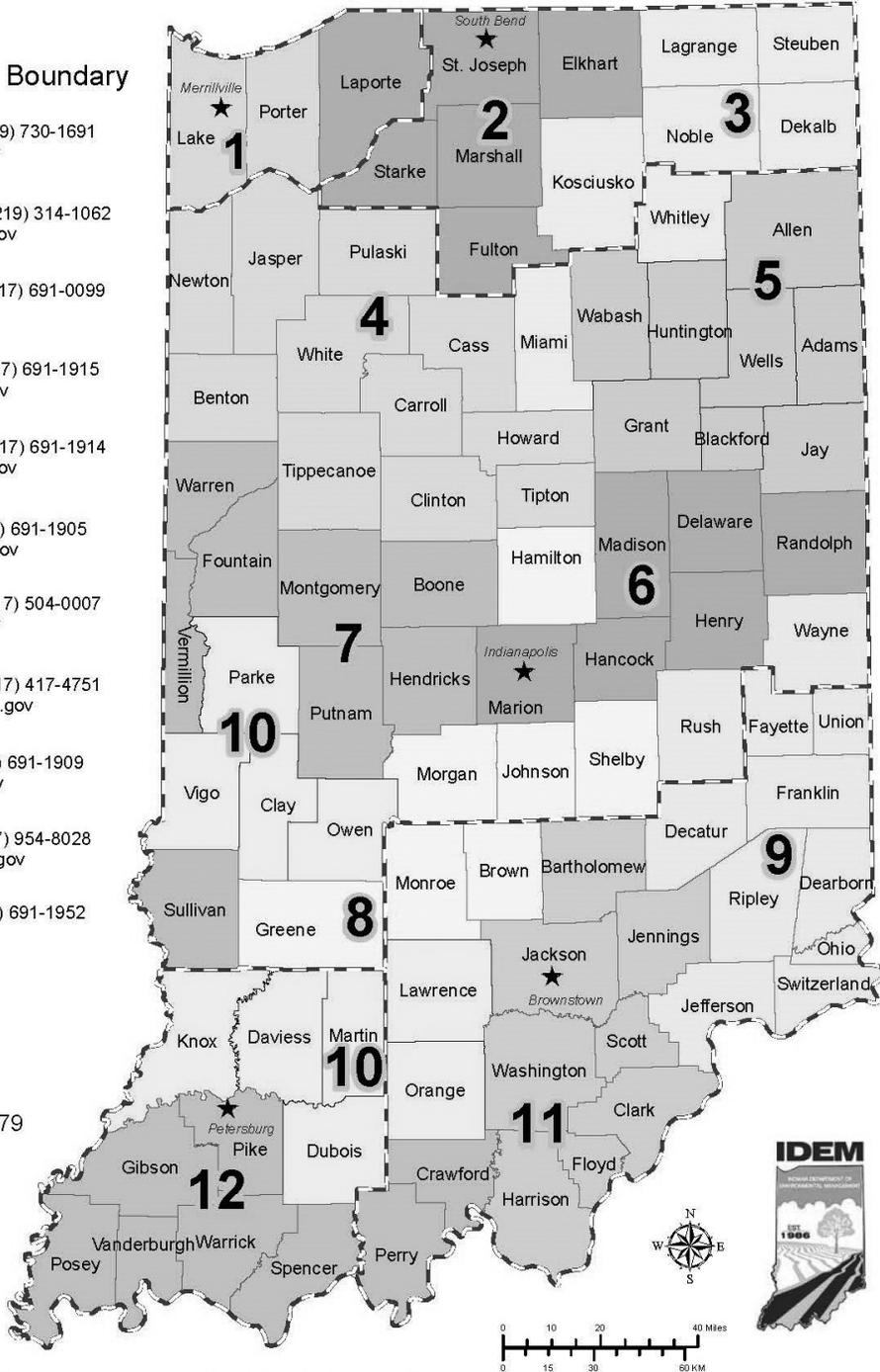
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**Non Orthophotography Data**  
- Obtained from the State of Indiana Geographical Information Office (GIO) Library  
**Map Projection:** UTM Zone 16 N  
**Map Datum:** NAD83

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Office of Water Quality - Compliance Section

## WARM WEATHER CHECKLIST *(continued from page 4)*

### EMERGENCY PREPARATION

- Take out your emergency management plan and review.
- Update emergency contact phone numbers.
- Place emergency management plan with emergency contact phone numbers in a prominent location in your office. Label it so that if you are not there, others who may be called on to fill in for you will be able to find it and use it.
- Get permission from your board, town manager, or mayor to identify and cross-train two or three individuals so that they can operate the system safely during an emergency. Then get them cross-trained. TIP: Look for suitable retirees in your community to fill this need if you do not have access to other personnel within your organization.
- Write down your critical operating procedures and maybe even put labels on some of the equipment and controls. Have the people who you are cross-training help you write the procedures and identify what needs to be labeled.
- Make a list of your current chemical suppliers, including phone numbers, and a list of the specific chemicals you purchase on a regular basis.
- Assemble a set of spare keys and put them in a location where the folks you cross-trained can gain access to them.
- Check and test generators and hook-ups—or—check where to rent generators locally if you do not have one. Be sure all hook-ups are compatible.

### TRUCKS, BACKHOES, OTHER EQUIPMENT

- Change fluids as needed for colder weather.
- Check tires for wear.
- Utilize tire chains as appropriate.

### WORKER NEEDS

- Warm boots and/or waders.
- Warm waterproof gloves.
- Heaters in needed areas.
- Small generators.
- Emergency lighting, including good flashlights and fresh batteries.

### EMERGENCY STOCK ITEMS

- Repair Clamps.
- MJ Sleeves.
- Compression Fittings.
- Roll Plastic.
- Lids and Rings.
- Saddles (3/4" and 1").
- Valve Boxes (tops and bottoms).
- Back-Up Generators (pull behinds, portables, etc.).
- Drinking water safe hose and fittings for interconnecting houses, if needed, due to frozen pipes.
- Pipe thawing equipment—own, rent, or borrow.
- Meter Pit Insulators.
- Extra Fuel—rotate to keep fresh.
- Tires and tire chains.

Have a safe and enjoyable winter! Remember, Indiana has quick and unexpected weather changes, so start your cold weather preparedness now!

## ESSENTIAL ELEMENTS OF A SUCCESSFUL FOG

As enforcement action for sanitary sewer overflows (SSOs) and combined sewer overflows (CSOs) increases throughout the country, so does the development of fats, oils, and grease (FOG) management programs. Although there are a variety of causes of SSOs and CSOs, one common culprit is FOG blockages and buildup in collections systems. If you have overflows in your collection system then you should have a FOG program to help alleviate them. To develop a successful FOG management program your utility will need support from your utility director and/or town board, well-defined rules, adequate personnel, and a public education initiative.

Management support for the FOG program is the most important element to success. Without the support of your board and/or director, you will not be able to implement and enforce your program. To gain the necessary support required, you should track FOG blockages in your collection system, FOG issues in lift stations, and record video inspections of problem-areas in your collection system. Providing information and pictures regarding overflows and maintenance issues to your director or board can be effective in gaining their support. Relating overflows and blockages to expenses for personnel, equipment, etc., can also be effective with this task. You can also invite board members and supervisors to ride along with your employees on service calls. Seeing the problems in person can gain their respect and support. Once you can demonstrate that FOG is causing problems in the collection system and these problems translate into expenses, you will be on your way to receiving their support for a FOG program.

Educating your director or board on regulatory requirements can also help you gain support required to operate a FOG program. Both federal and state regulations prohibit CSOs and SSOs. IDEM may enforce CSO and SSO prohibitions on Public Owned Treatment Works (POTWs) which means your facility could end up addressing overflows through an agreed order or other enforcement mechanism. Focusing your efforts on regulatory requirements can be a good incentive for your director or board to support a FOG program.

Once you have support to develop, implement, and enforce a FOG program, you will need to develop the rules for your program. Communities all across the country have developed FOG programs, so you can look to them for ideas and support. You will need to determine who the rules will apply to and what rules you will enforce. There are a variety of program structures including tiered programs which require FSEs to follow rules based on their menus, size or other criteria. There are programs that require all FSEs to comply with the same rules regardless of size or type of facility. There are also programs that include a residential FOG component that focuses on education of all customers. Don't hesitate to reach out to other communities for their thoughts, ideas, and examples of success and failure.

Staffing your program is also necessary for its success. You need to designate and possibly hire new personnel for your FOG program. Tracking FSE information such as location, contact information, equipment, maintenance requirements, etc. is an essential part of your program that demands a significant time investment. Someone will be required to develop and oversee the program, perform inspections, enforce your requirements for equipment installation and maintenance, and to perform educational functions. Your staff will also need to be properly trained to implement and enforce the program successfully. While staffing can be expensive, you should be able to justify the cost by saving money on FOG-related maintenance expenses in the collection system and emphasizing regulatory requirements prohibiting overflows.

Finally, an initiative to inform and educate the public and customers is a key element to any FOG program. FOG programs can sometimes be controversial during implementation and enforcement. However, if you spend time educating management, board members, and customers early in the process, you will typically encounter fewer issues during enforcement of the program. Education initiatives can be inexpensive but effective. Some programs use brochures, bill inserts, or local newspapers to get their messages out.

Although developing a new program may seem overwhelming, focusing on gaining support from your director or board, developing rules, dedicating personnel, and educating your customers and community will help your FOG program be a success!

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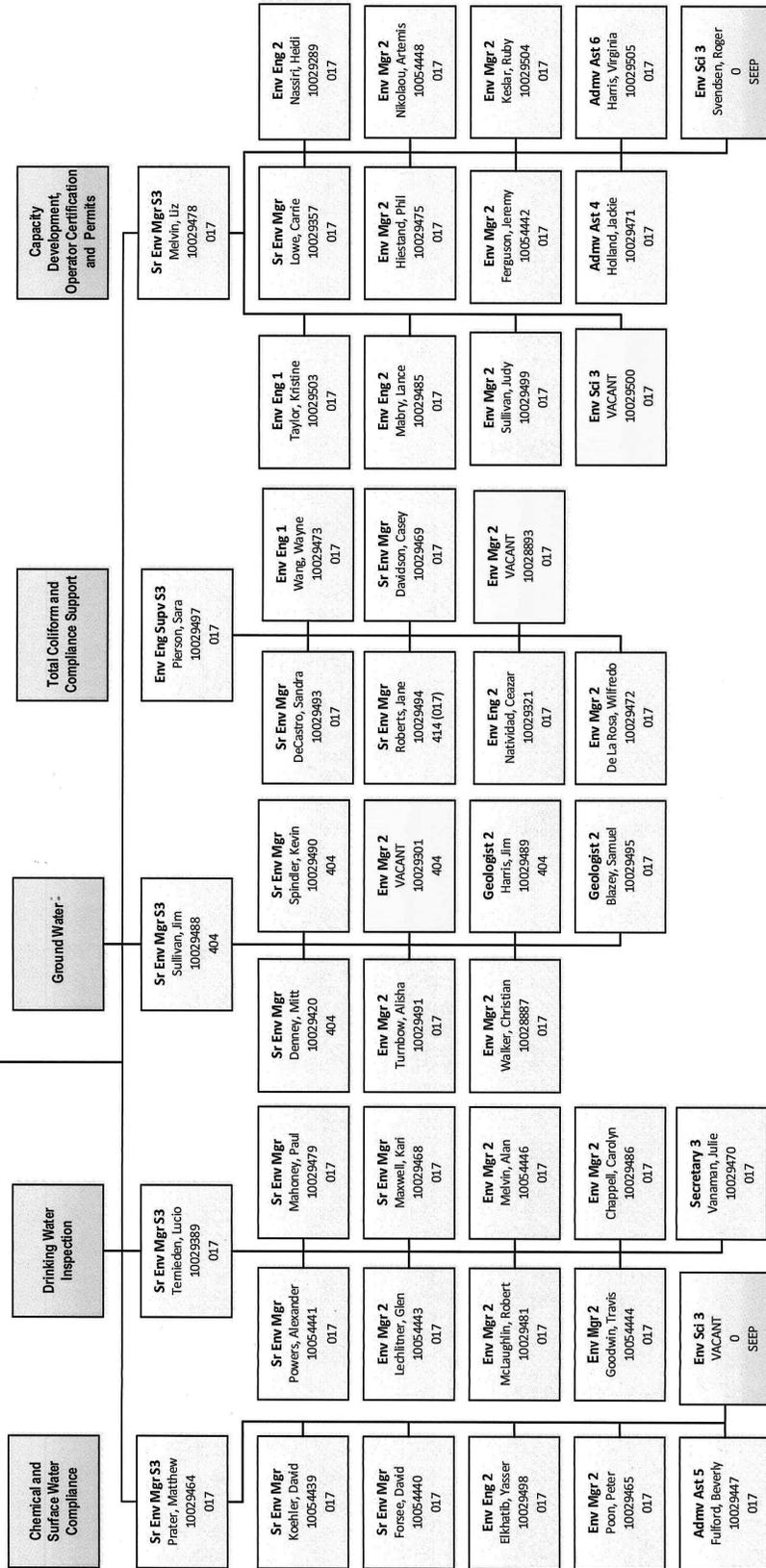
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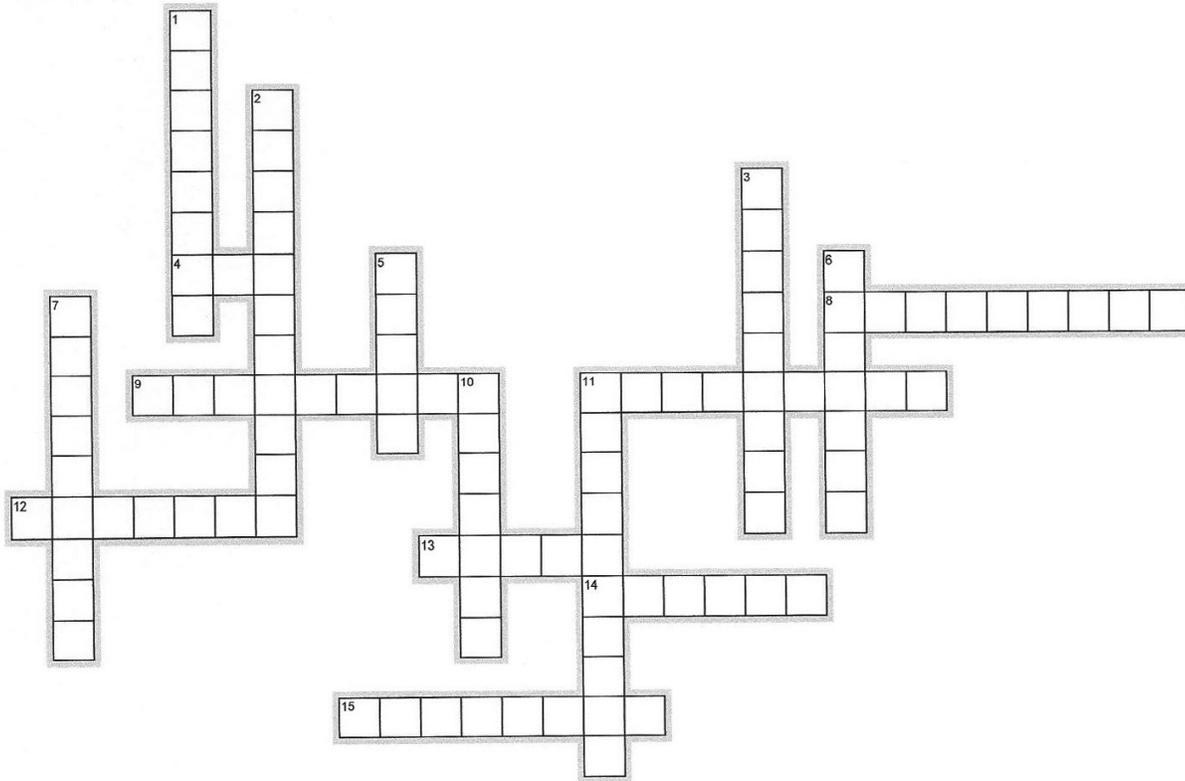
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**Office of Water Quality**  
**Drinking Water Branch**  
 November 22, 2016



## Collection Crossword - III

Barbara Smith



EclipseCrossword.com

### Across

4. Water lubrication is \_ typical of a "submersible" pump.
8. A flood would be considered a natural event, however, this would not.
9. Enclosed, open and semi-closed are terms used for the designation and selection of this.
11. If a pump outputs 625 GPM against a TDH of 211 feet, and the pump is 71% efficient, what is the brake HP if the fluid being pumped has a specific gravity of 1.12? Round up.
12. If a repair job can be done by 7 people in 8.5 hours, how long will it take 4 people to do a similar job in hours? Round up.
13. How many minutes in an hour.
14. When opening a power rodder properly, make sure all teh \_ is out of a broken rod.
15.  $(D2) \times 0.785 \times D$  is the formula for what shape

### Down

1. This and volatile solvents are objectionable when present in a sewer because they can cause an explosion hazard.
2. Calculate the water horsepower if the pump it operates provides 1,475 gpm against 125 feet TDH.
3. When trench shoring these facotrs must be considered: structures and sources of \_.
5. This type of connection is least likely to be performed by collection system personnel.
6. This type of meter measures quantity of fluid by the difference in pressure between a constricted and full-size portion.
7. Biological hazards in collection systems include this.
10. Aluminum hydraulic is a type of this.
11. If a sewer must have a flow rate of 27 MGD with a velocity between 1.50 ft/sec and 2.75 ft/sec, the minimum size pipe is this if inches.

**Small Systems Committee  
INDIANA SECTION AWWA**

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[www.inawwa.org](http://www.inawwa.org)

**American Water  
Works Association:**  
[www.awwa.org](http://www.awwa.org)

**EPA Drinking  
Water Hotline:**  
[www.epa.gov/OGWDW](http://www.epa.gov/OGWDW)



## MARK YOUR CALENDARS!!

To add dates to this section,  
contact any Small Systems  
Committee Member.

**January 31 – February 2, 2017** – Indiana Section American Water Works Association – Annual Conference – Indianapolis, Indiana. Contact: Dawn Keyler at 866-213-2796 (toll free); or visit the InAWWA website at [www.inawwa.org](http://www.inawwa.org)

**March 15 - 16, 2017** – Alliance of Indiana Rural Water – Spring Conference – French Lick Resort; French Lick, Indiana. Contact: Laura Vidal at 888-937-4992 or visit the Alliance website at [www.inh2o.org](http://www.inh2o.org)

**April 24, 2017** – Indiana Rural Water Association – Annual Golf Outing (to benefit the Gambold Education Fund and other IRWA educational initiatives) – Otter Creek Golf Course; Columbus, Indiana. Contact: Odetta Cadwell at 317-402-7349; MaryJane Peters at 866-895-4792 (toll free); or visit the IRWA website at [www.indianaruralwater.org](http://www.indianaruralwater.org)

**April 24 – 26, 2017** – Indiana Rural Water Association – 2017 Spring Conference – Clarion Hotel & Conference Center; Columbus, Indiana. Contact: Odetta Cadwell at 317-402-7349; MaryJane Peters at 866-895-4792 (toll free); or visit the IRWA website at [www.indianaruralwater.org](http://www.indianaruralwater.org)

**May 4, 2017** – Indiana Section AWWA – Southeast District – Spring Meeting – Location to be determined. Contact: Dawn Keyler at 866-213-2796 (toll free); or visit the InAWWA website at [www.inawwa.org](http://www.inawwa.org)

**May 10, 2017** – Indiana Section AWWA – Central District – Spring Meeting – Location to be determined. Contact: Dawn Keyler at 866-213-2796 (toll free); or visit the InAWWA website at [www.inawwa.org](http://www.inawwa.org)

**May 18, 2017** – Alliance of Indiana Rural Water – Southern Expo – Huntingburg, Indiana. Contact: Laura Vidal at 888-937-4992 or visit the Alliance website at [www.inh2o.org](http://www.inh2o.org)

**May 19, 2017** – Indiana Section AWWA – Northwest District – Spring Meeting – Location to be determined. Contact: Dawn Keyler at 866-213-2796 (toll free); or visit the InAWWA website at [www.inawwa.org](http://www.inawwa.org)

**May 24, 2017** – Indiana Section AWWA – Southwest District – Spring Meeting – Holiday World. Contact: Dawn Keyler at 866-213-2796 (toll free); or visit the InAWWA website at [www.inawwa.org](http://www.inawwa.org)

**May 31, 2017 (tentative)** – Indiana Section AWWA – Northeast District – Spring Meeting – Location to be determined. Contact: Dawn Keyler at 866-213-2796 (toll free); or visit the InAWWA website at [www.inawwa.org](http://www.inawwa.org)

**July 26, 2017** – InAWWA Annual Golf Outing (to benefit Water For People and One AWWA Operator Scholarship) – Indianapolis, Indiana. Contact: Dawn Keyler at 866-213-2796 (toll free); or visit the InAWWA website at [www.inawwa.org](http://www.inawwa.org)