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# *Morgan St YMCA Swimming Pool Incident*

*August 2<sup>nd</sup>, 2017*



# Downtown Durham YMCA

218 W Morgan St, Durham, NC 27701

August 2<sup>nd</sup>, 2017

- ❑ At approximately 2:30 PM, DCo Environmental Health received a complaint from an unidentified caller reporting a strong chemical smell that had caused respiratory distress for herself and other swimmers at the YMCA located at 218 W Morgan St. She stated that approximately 100 children were being removed from the facility
- ❑ John Williams, DCo Swimming Pool Program Specialist, was contacted and directed to follow up with the facility operators. He was already in the field and not far away
- ❑ John spoke with the Facility Director who indicated the pool had been closed and the entire facility was being evacuated. The Director stated that there was a strong chemical smell coming from the equipment room and pool area and that EM, EMS, and City Fire were on site and the site had been designated as a HAZMAT area





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- At 3:00 PM the Environmental Health Director notified the Department of Public Health Director and both Deputy Directors as well as the PH PIO of the incident
- At 5:30 PM Katie Mallette, DCo Public Health Administrator, contacted EH Director to inform him that she had received a call on the Public Health 24/7 After Hours phone informing her that 42 people had been taken to the hospital. All were suffering from respiratory distress (we later learned the actual total was 43).

*Continue narrative.....*





# Swimming Pool Water Quality

*Pool water must be **balanced***

Water containing no dissolved material acts as a solvent and attacks pool surfaces, damages pipes, and other equipment. This is water's natural attempt to become "*balanced*".

Water containing too much dissolved material becomes "*balanced*" by dropping calcium carbonate out solution creating scale. Scale attracts dirt, clogs filters, and creates dark deposits on surfaces.

***Balanced water optimizes disinfection and protects the pool and provide bathers with a more enjoyable experience***





# Swimming Pool Water Quality

One of the Key Factors in achieving “balanced” water is maintaining proper pH

Two very important reasons to maintain proper pH are:

- I. Disinfecting power of free chlorine varies with pH. As pH increases, the disinfecting power of chlorine goes down.
- II. The human body typically has a pH of 7.2 to 7.8. If pool water is maintained outside this range, swimmers eyes and skin will become irritated.



# Swimming Pool Water Chemistry

**Taylor Test Kits** utilize a colorimetric test block comparator with printed standards & reagents



Water Quality	pH
Poor Chlorine Disinfection Eye Irritation Skin Irritation	> 8.0
Most Ideal for Eye Comfort and Disinfection	7.8
	7.6
	7.2
Eye Irritation Skin Irritation Pipe Corrosion	< 7.0



# Swimming Pool Water Quality

Automated systems are commonly used to maintain water quality today:

Monitoring

Disinfection

pH balance

*Filtering is part of the ongoing circulation process*





# Chemicals & Agents of Pool Water

**Sodium Hypochlorite**

**Sulfuric Acid**

Sodium carbonate (Soda Ash)

Cyanuric Acid

Clarifiers

Defoamers





# Chemical Monitoring & Delivery

Sensors, controllers, delivery pumps



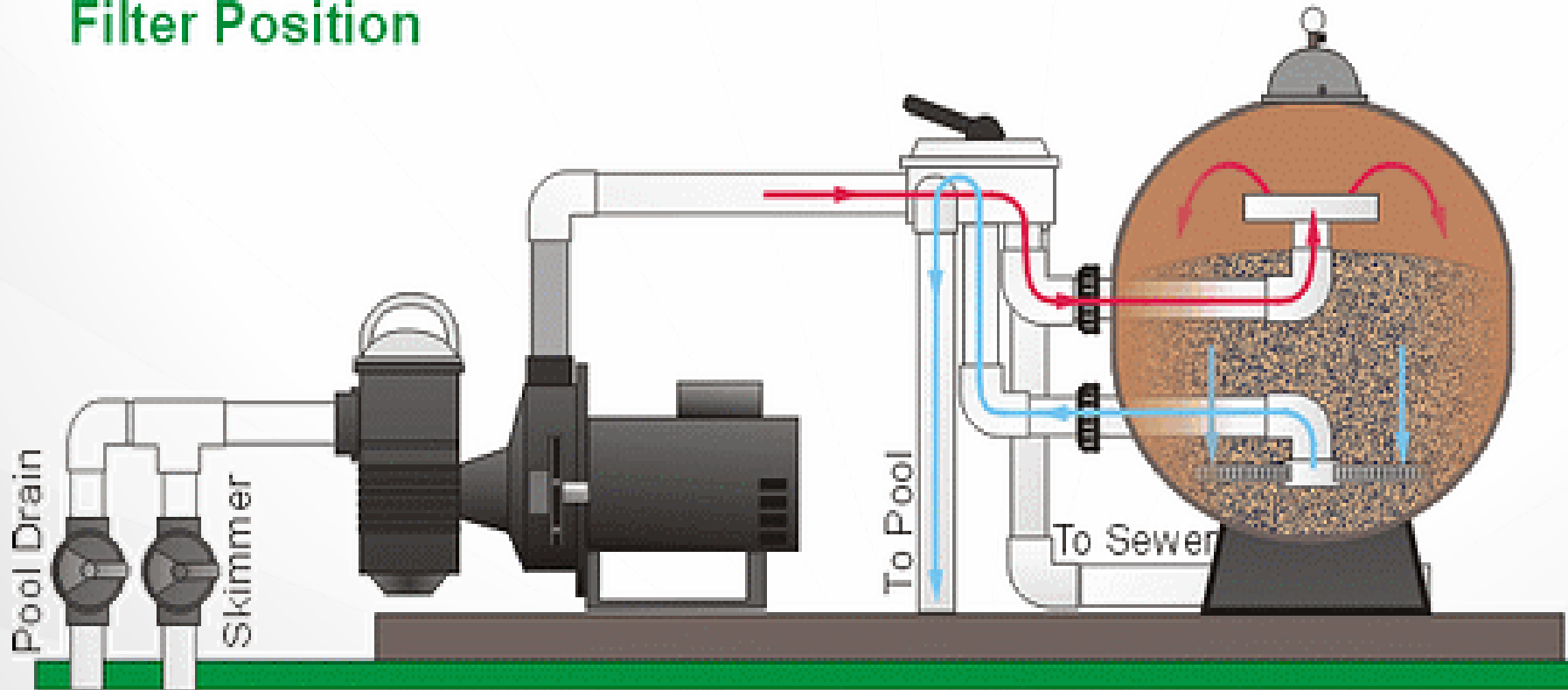
# Swimming Pool Filtration

Common Sand Filter Configuration

**Multiport Valve**

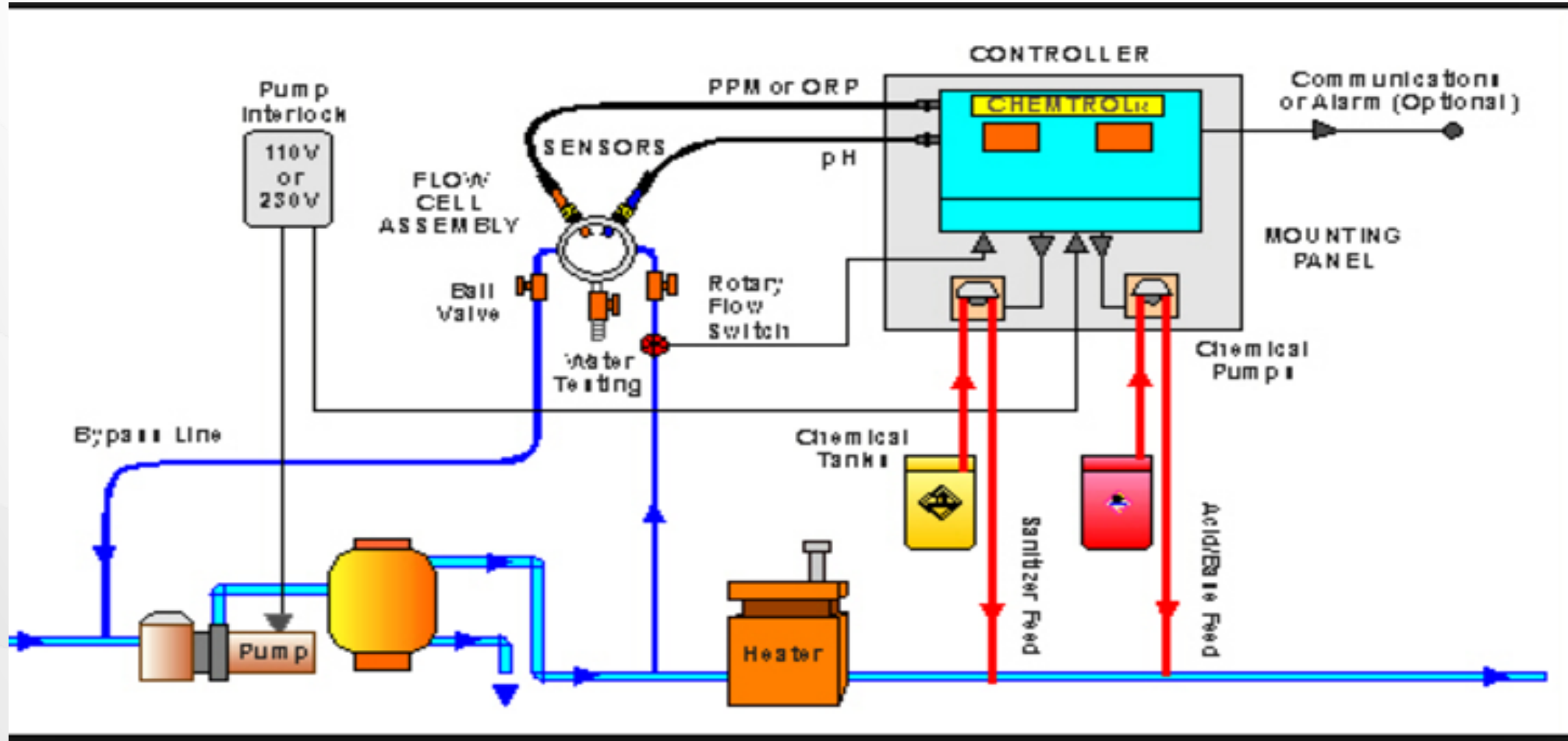
**Sand Filter**

**Filter Position**

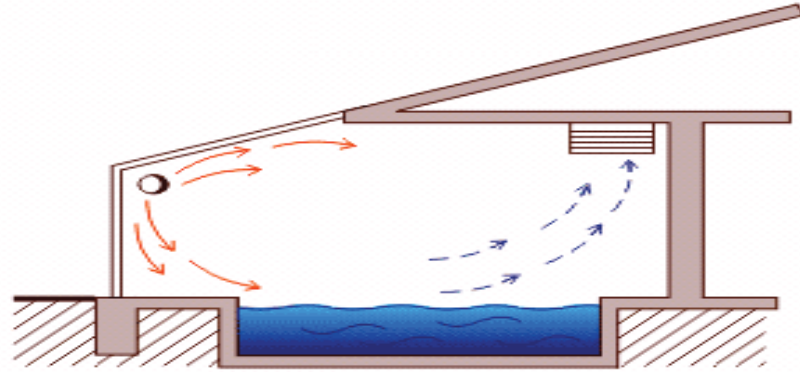


# Complete Setup

Filtration, Monitoring & Chemical delivery



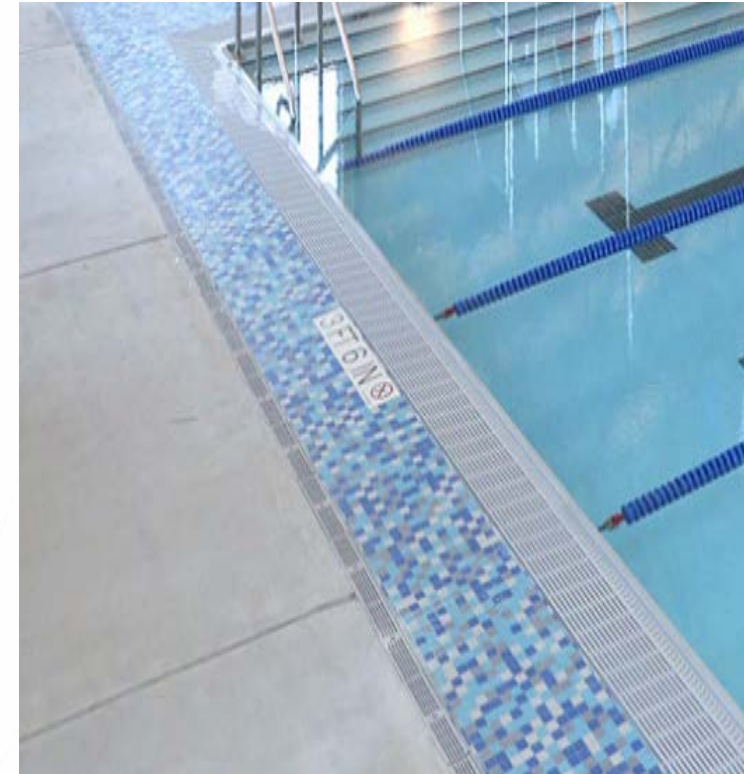
# Indoor Swimming Pool Ventilation



- ❑ Relative humidity levels above the 40% to 60% range can result in increased levels of bacteria, viruses, mold, and other factors that impact air quality.
- ❑ Swimmers typically are most comfortable at a range of 50% to 60% relative humidity.
- ❑ Higher levels will result in mold growth, damage to building surfaces, and corrosion which can weaken the structure and result in expensive repairs.

# Large Pool

## Ventilation & Deck Drains



# Large Pool

Ventilation & Deck Drains



# Downtown Durham YMCA

218 W Morgan St, Durham, NC 27701

## Chemicals

Sodium Hypochlorite & Acids



## Ventilation & Drainage



## Filtration & Drainage

Common Sand Filter



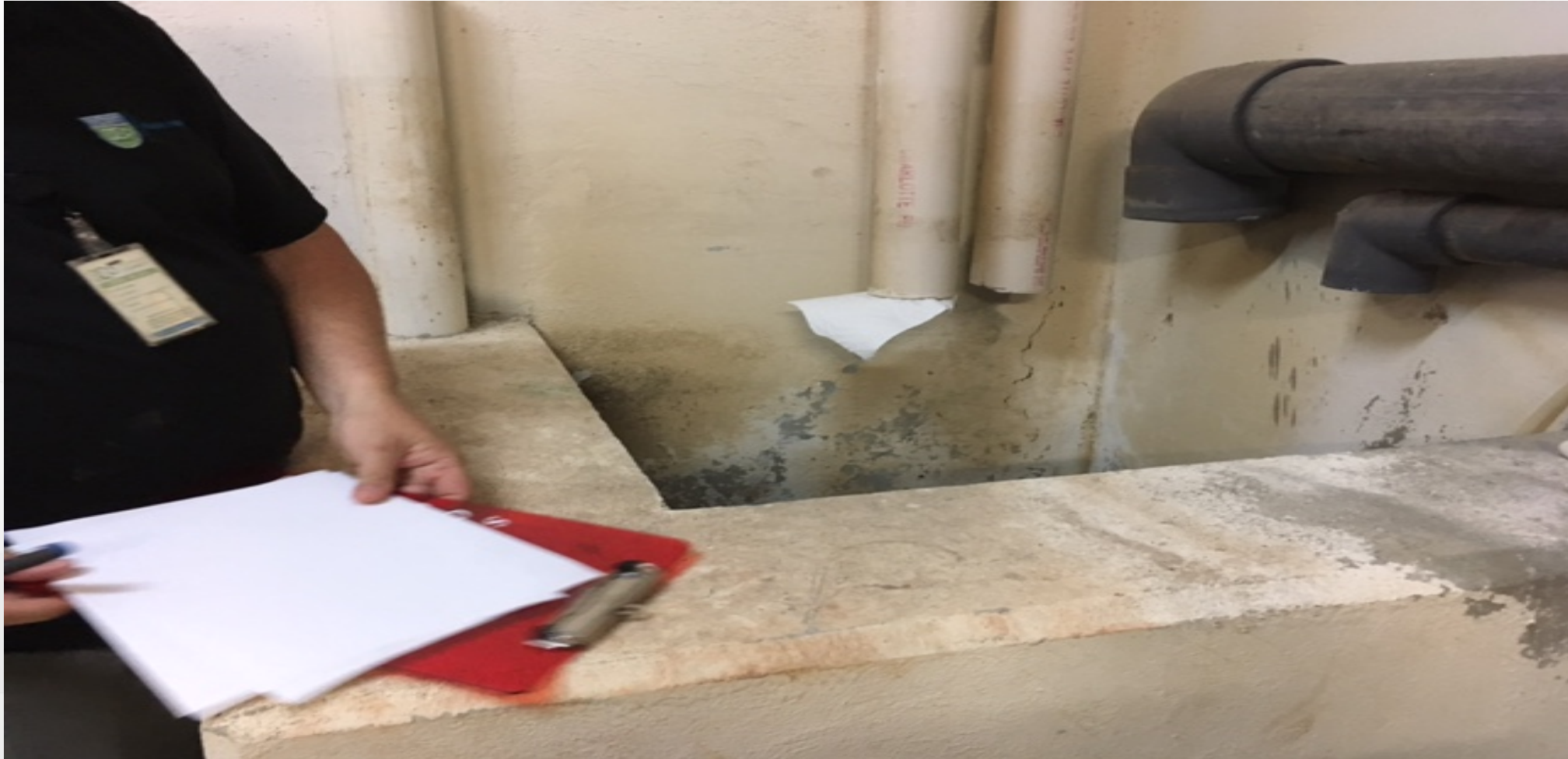
# Backwash Sump & Mystery Pipes





# Backwash Sump & Mystery Pipes

Sump





# Contributing Design Factors

- ❑ Morgan St YMCA swimming pool deck drains discharge to the pool filter backwash sump
- ❑ The pool area has a great ventilation system
- ❑ Ventilation for the equipment / chemical room consists of door louvers (not so great)



# **RULES GOVERNING PUBLIC SWIMMING POOLS 15A NCAC 18A .2500**

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## **15A NCAC 18A .2533    EQUIPMENT ROOM**

**(e) Natural cross draft or continuous forced ventilation is required.**

## **15A NCAC 18A .2534    CHEMICAL STORAGE ROOM**

**(3) Natural cross draft or continuous forced ventilation is required.**

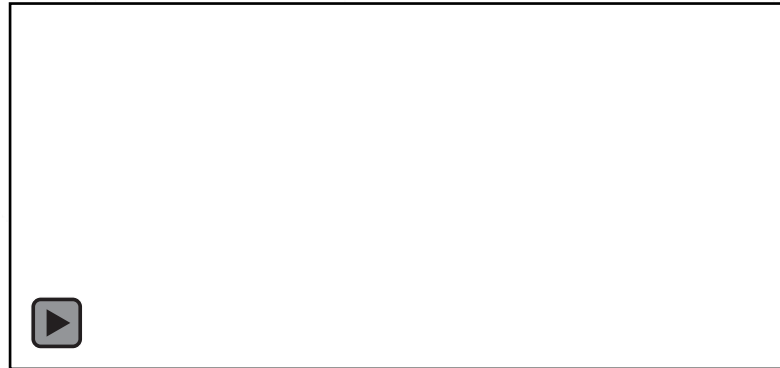
***Nothing in the rules addresses deck drain discharge***



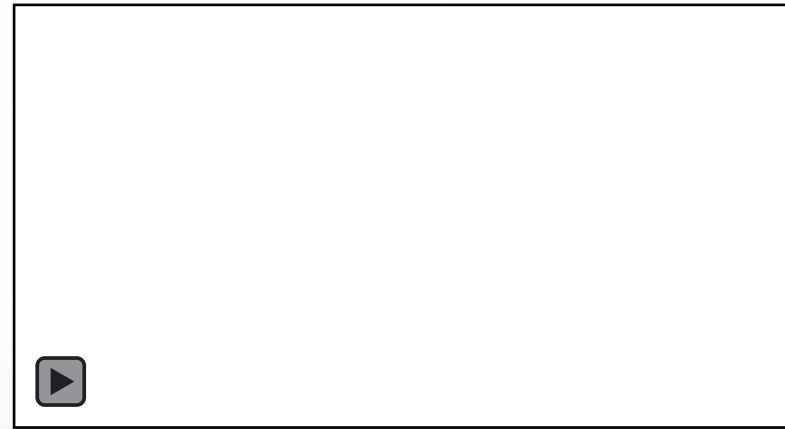
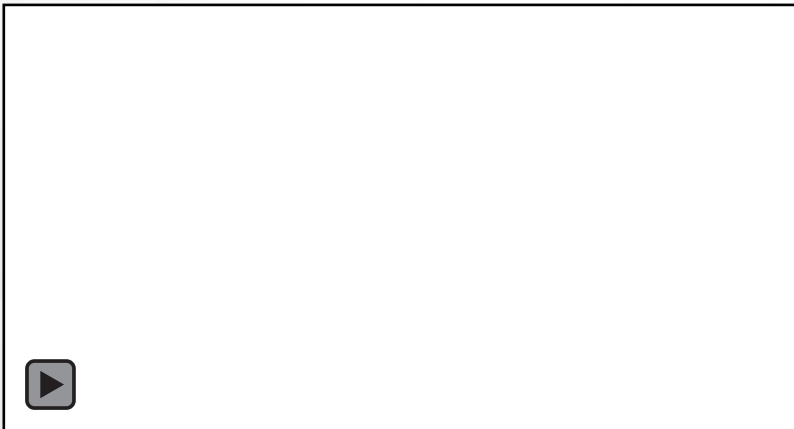
# Video Clips

L:\EnvnHlth\Onsite Water Protection Section\POOL PROGRAM\2017 DT YMCA Incident\2017 218 W Morgan St YMCA Photos\2017 218 W Morgan St YMCA video clips

Smoke generation in equipment/chemical room

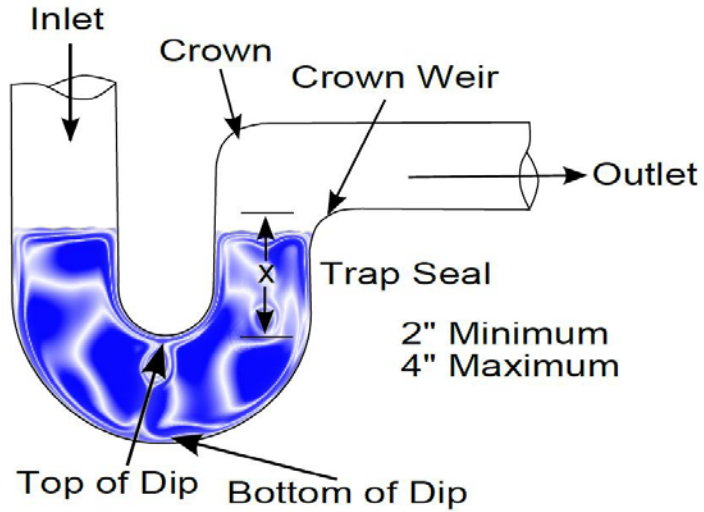


Smoke coming up through deck drains



# Corrective Actions

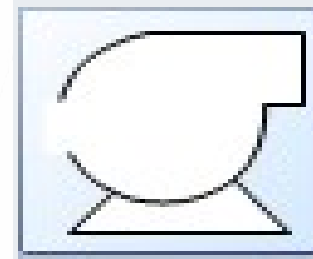
## P-Trap



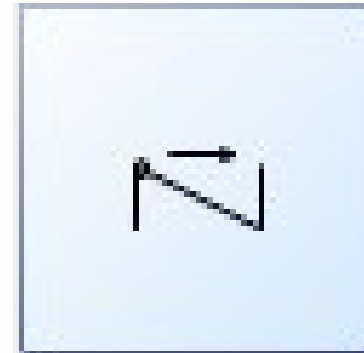
## Blower



## New Pumps & Check valves



Centrifugal



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*Questions?*

*September 11th, 2017*

Thank You!



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