

Lessons Learned From Mass Chlorine Exposures at Recreational Swimming Pools

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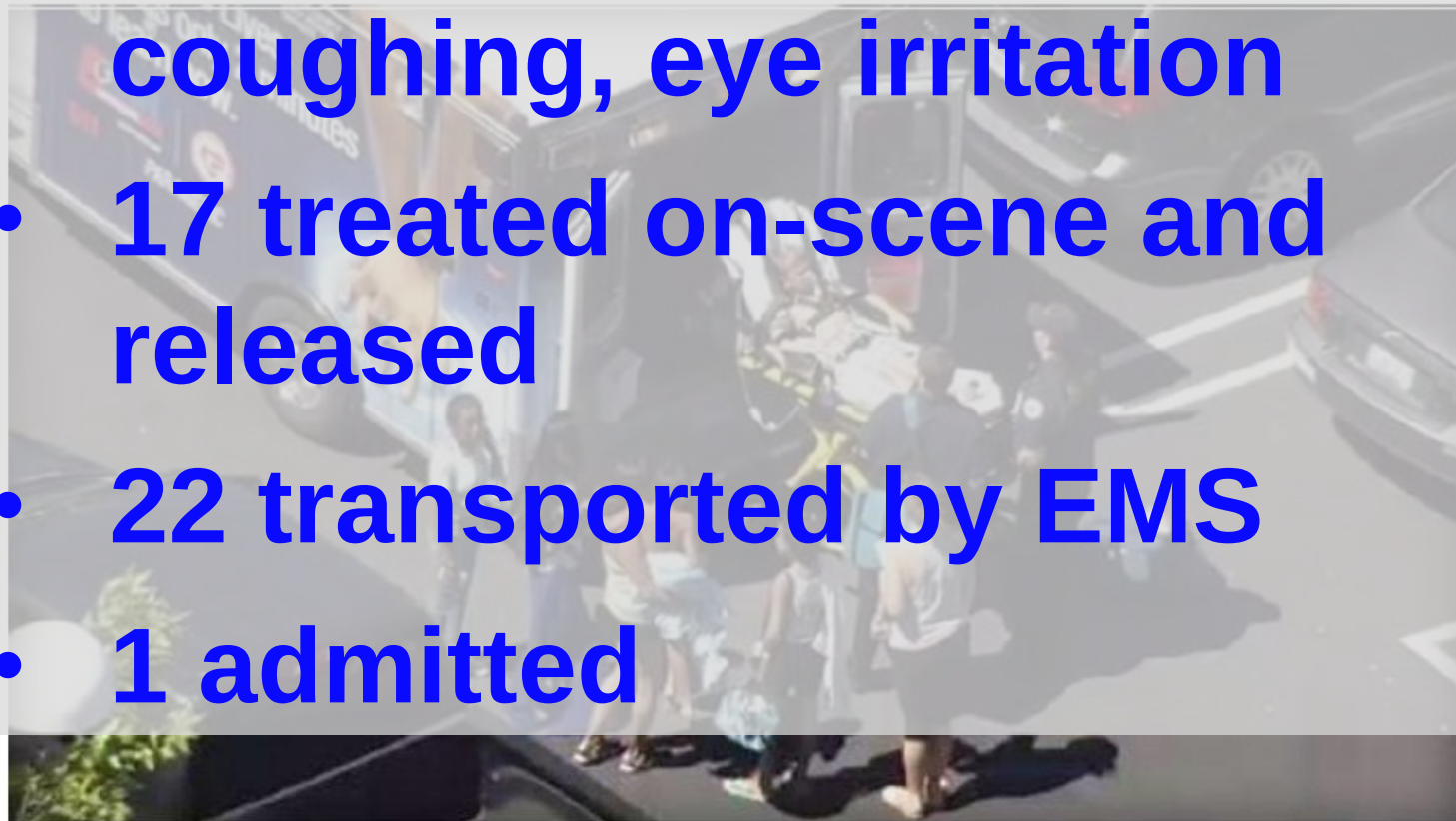
EH₂O Recreational Waters

Overview

- **Introductions/agency structure**
- **County investigation of Cl₂ incident**
- **State perspective & other incidents**

17 hospitalized after possible chemical exposure

- 39 experienced vomiting, coughing, eye irritation
- 17 treated on-scene and released
- 22 transported by EMS
- 1 admitted



About 40 children became ill while swimming at a city-run water park in Antioch after excessive chlorine apparently leaked into the water.

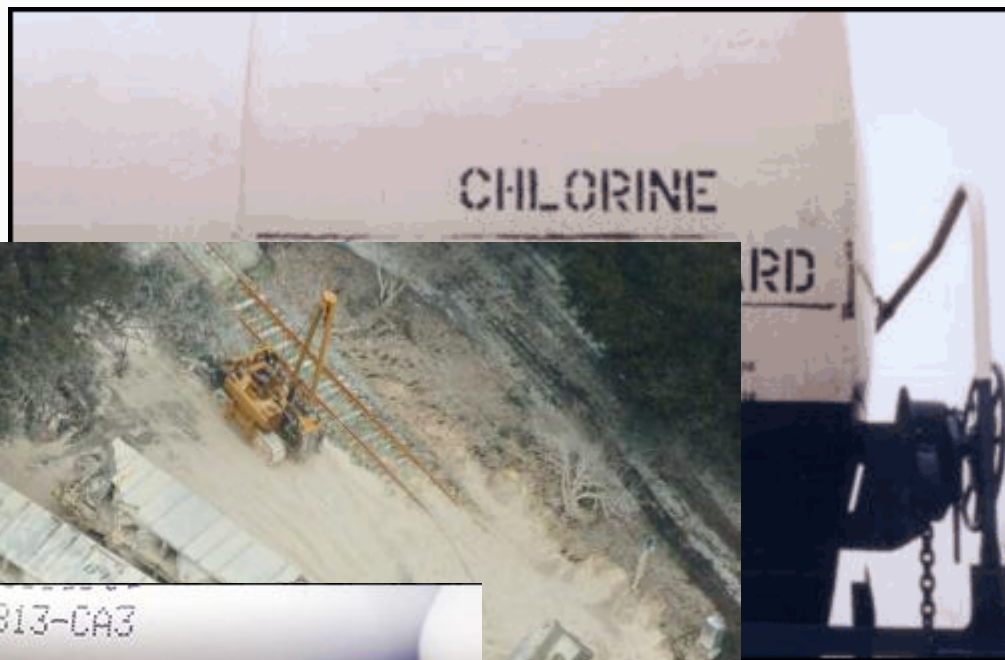
/ CBS SAN FRANCISCO

Chlorine

- Widely used and commonly manufactured
- Respiratory irritant
- Exposure symptom range from mild respiratory irritation to inflammation of bronchioalveolar tissues
- 40–60 ppm: lung injury and pulmonary edema
- 430 ppm: death after 30-min exposure



Chlorine



**WHO ARE WE AND WHAT
ARE WE DOING HERE?**



**Chronic Disease and
Health Promotion**

**Environmental
Health**

Others

**Division of
Environmental and Occupational
Disease Control**

Occupational

Environmental

Laboratory

Emergency Preparedness Team (EP Team)



DEODC EPTeam Capacities



County
Administrator

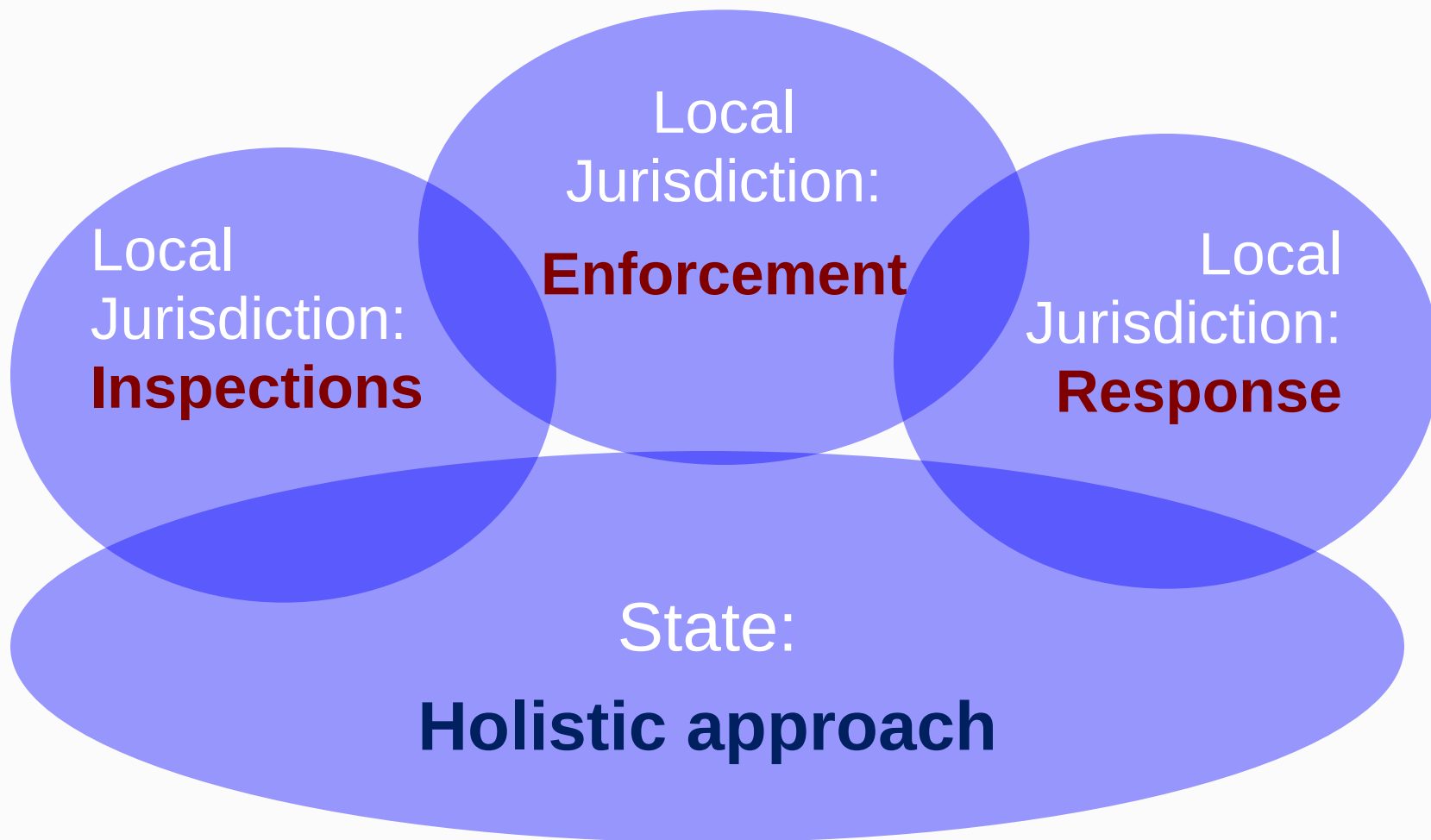


Hazardous Materials

Environmental Health

Others

Overall Fit



Is This a Hazmat Call? Environmental Health? Or Both?



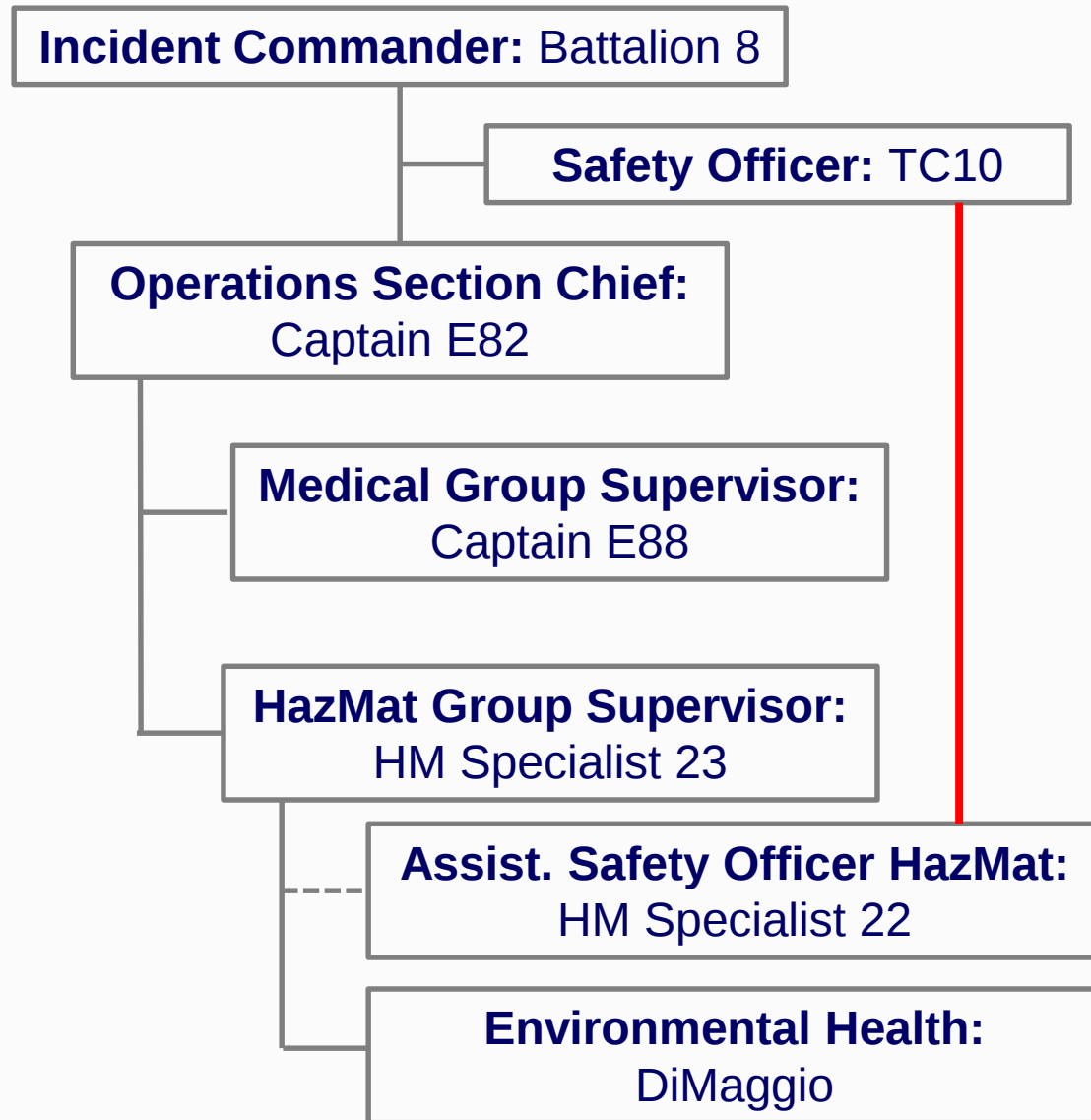
Timeline of Events

TIME	EVENT
14:29	First 911 Phone Call from Facility Staff
14:31	One Ambulance Dispatched – Code 2
14:36	Upgraded Ambulance to Code 3; Dispatch one Engine – Code 3
14:41	Dispatched 2 Additional Engines – Code 3
14:42	Engine On Scene Requests a Hazmat Response
14:44	Hazmat Response Canceled – No Active Leak
15:07	Hazmat Response Requested for Potential Leak – Code 2
16:14	Hazmat Unit On Scene (1.75 Hours after 911 Call)
16:30	Environmental Health Specialists On Scene

Media Coverage of the Incident



Command Structure for the Incident



5 Pools; 5 Pool Systems



Facility Closure

TITLE 22 - CALIFORNIA CODE OF REGULATIONS

Public Swimming Pools

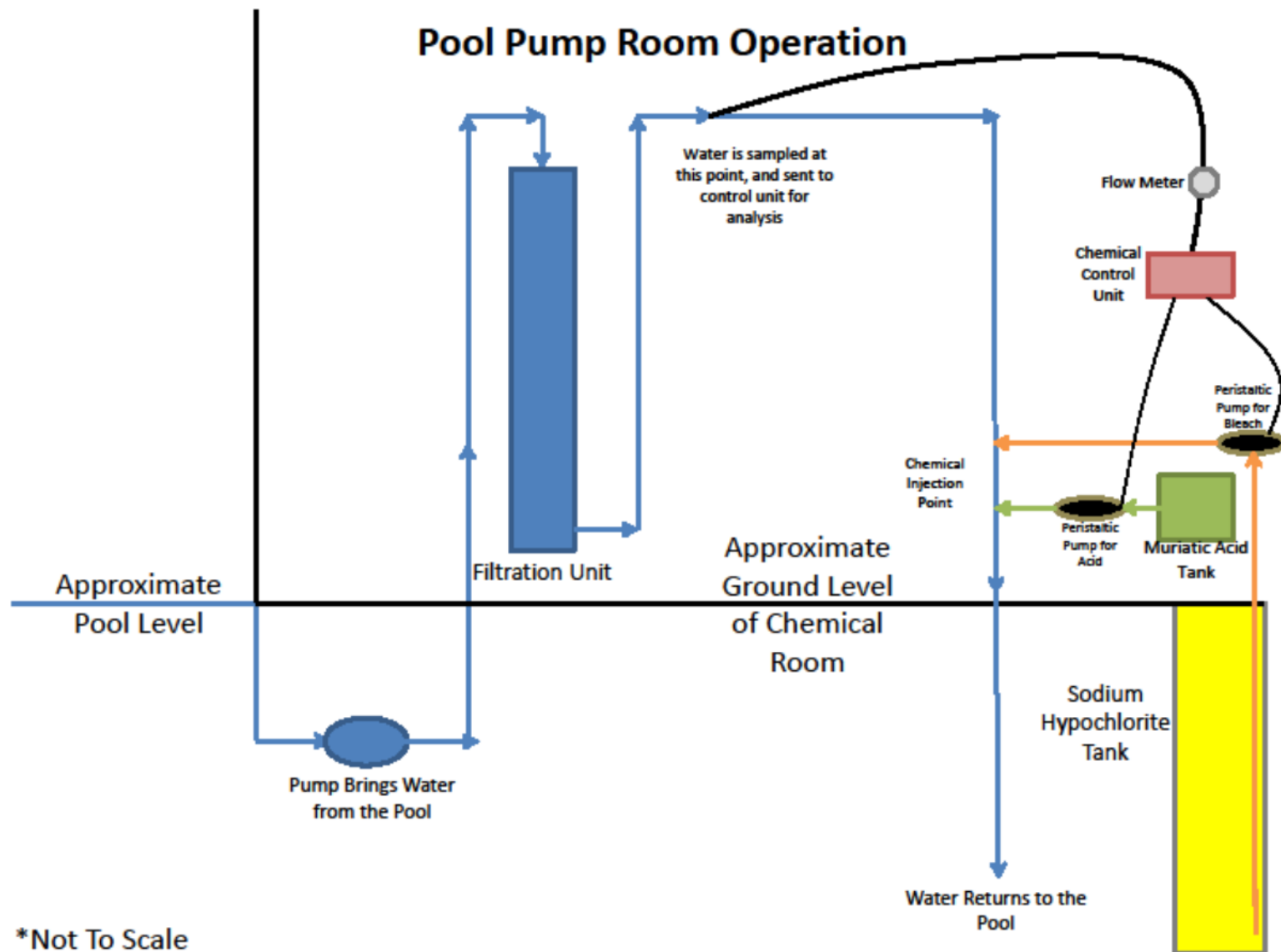
DIVISION 4. ENVIRONMENTAL HEALTH

CHAPTER 20. PUBLIC SWIMMING POOLS

65545. Public Pool Closure



Pool System Schematic



*Not To Scale

Pictures from the Pump Room



Photo 1, Controller Unit



Photo 2, Chemical Injection



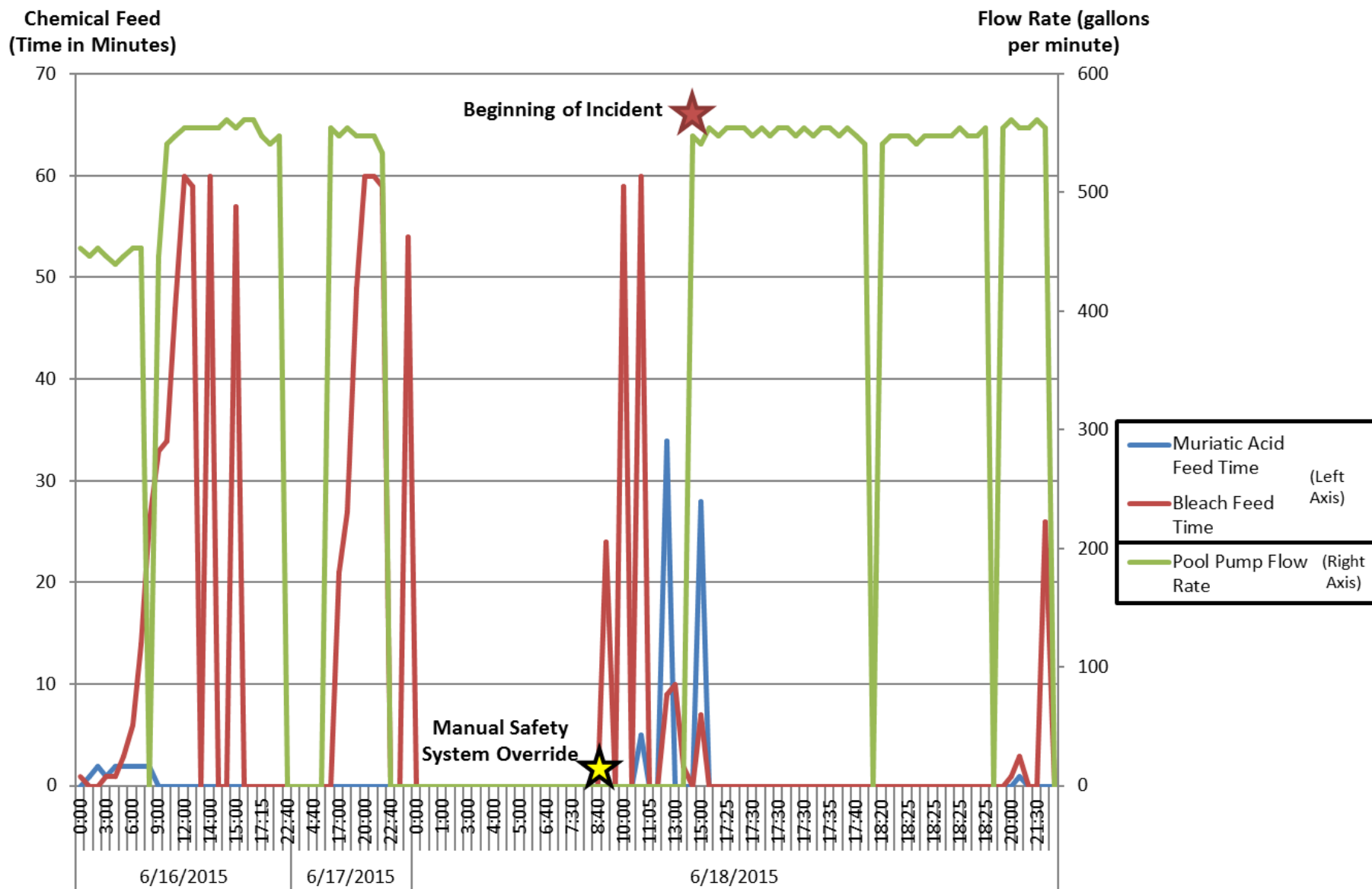
Photo 3, Acid Pump

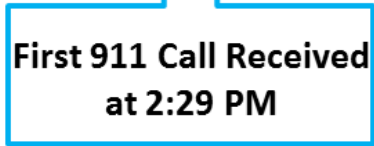


Photo 4, Bleach Pump

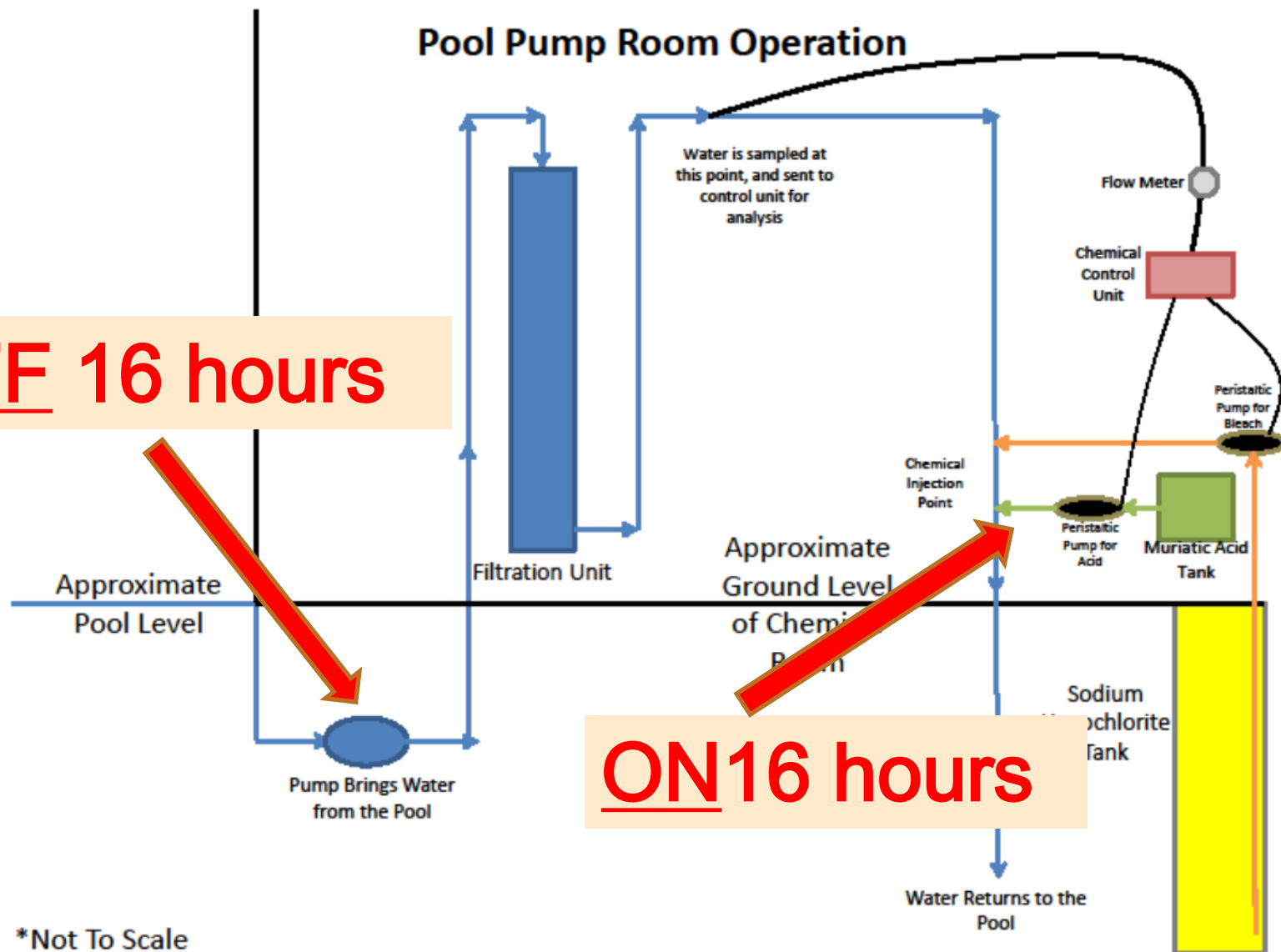
Documents Received from Facility

DATE	TIME	pH	pH Feed Time (min)	ORP	ORP Feed Time (min)	Flow Rate	Warning Sent
6/17/2015	10:00P	7.3	0	715	59	534	NO
6/17/2015	10:40P	7.3	0	700	0	0	YES
6/17/2015	11:00P	7.3	0	700	54	0	NO
6/17/2015	12:00P	7.3	0	690	0	0	NO
6/18/2015	8:00A	7.4	0	605	0	0	NO
6/18/2015	8:35A	7.4	0	595	0	0	YES
6/18/2015	8:40A	7.4	0	595	0	0	NO
6/18/2015	9:00A	7.4	0	590	24	0	NO
6/18/2015	9:30A	7.4	0	580	0	0	YES
6/18/2015	10:00A	7.4	0	580	59	0	NO
6/18/2015	11:00A	9	5	710	60	0	NO
6/18/2015	11:00A	8.7	0	735	0	0	NO
6/18/2015	11:05A	8.3	0	750	0	0	YES
6/18/2015	11:25A	7.7	0	795	0	0	NO
6/18/2015	12:00P	7.4	34	785	9	0	NO
6/18/2015	1:00P	7.3	0	785	10	0	NO
6/18/2015	2:00P	7.3	0	790	2	0	NO
6/18/2015	2:40P	7.6	0	810	0	548	NO
TOTAL			39		218		
6/18/2015	3:00P	7.4	28	810	7	541	NO
6/18/2015	4:00P	7.2	0	810	0	555	NO
6/18/2015	5:00P	7.1	0	805	0	548	NO
6/18/2015	5:25P	7	0	805	0	555	NO
			0.65 hour		3.633333333 hour		
			2.052916667 gallons		80.66 gallons		

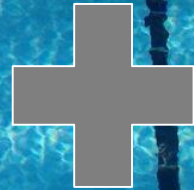




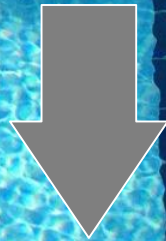
Pool System Schematic



Acid



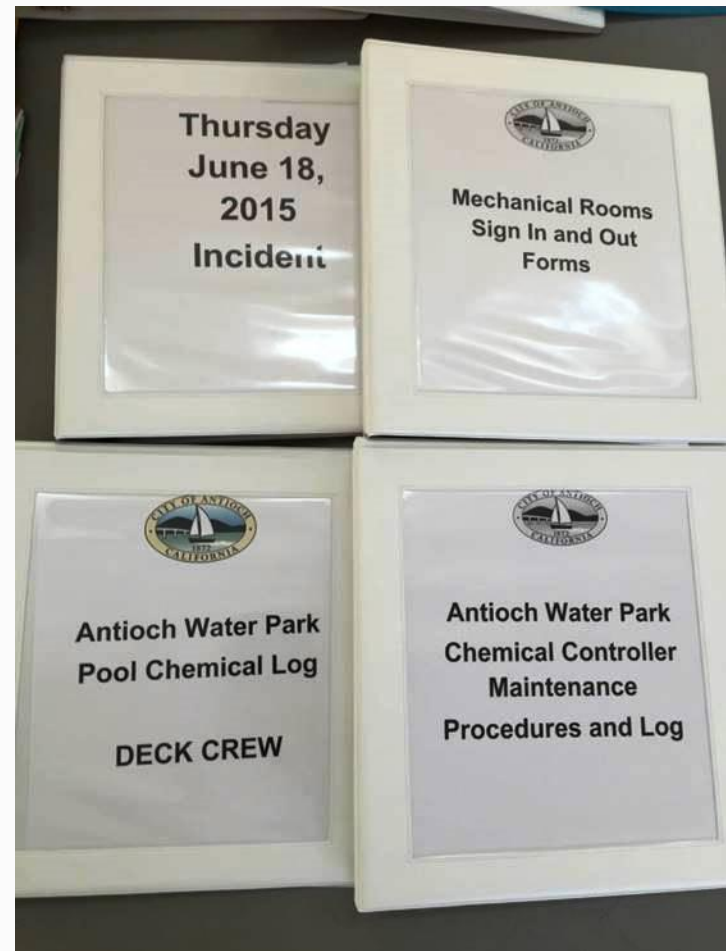
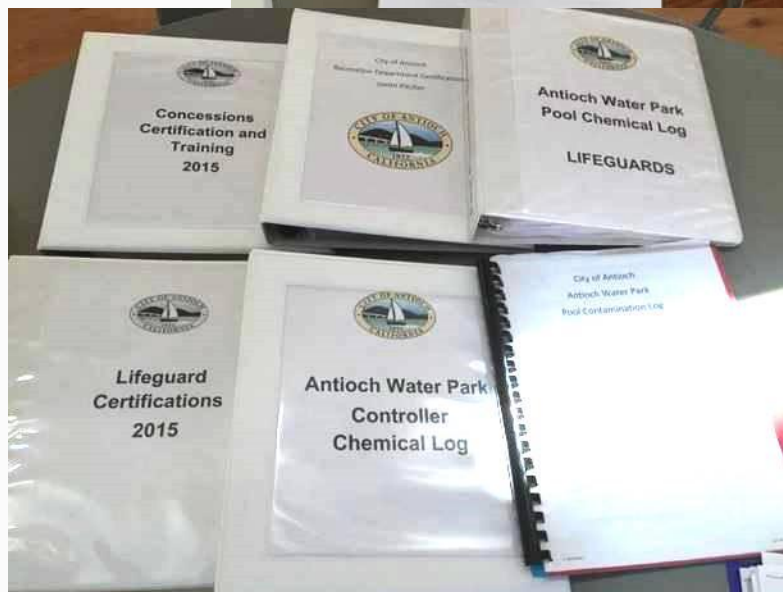
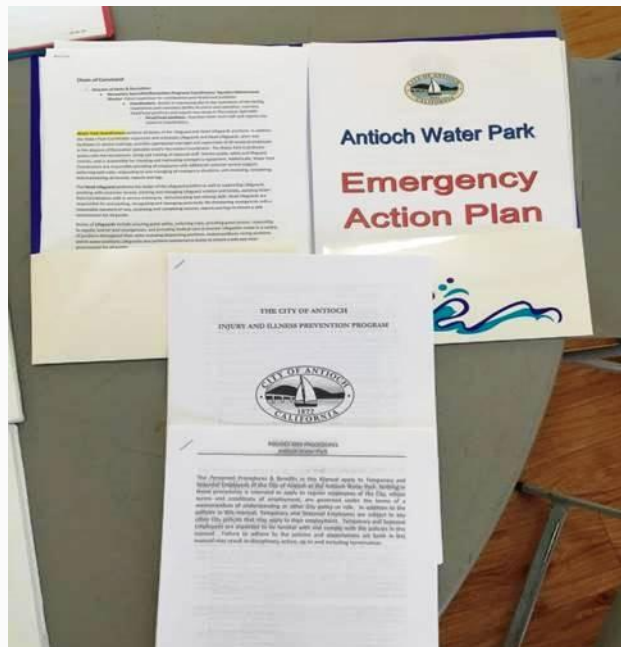
Bleach



**Cl
Gas**

Corrective Actions

PROCEDURES



POLICIES

Lessons Learned

- **Under reported HazMat incidents at pools**
- **Lack of awareness amongst pool operators**
- **Lack of experience in emergency response – where do we fit in?**
- **Communications**
- **Need to notify the HazMat / Recreational Health Program of an incident**

What's next?

- Health Officer Advisory
- Letter to manufacturers
- Lobby for change in standards and certification programs for chemical controllers
- Require secondary site-specific engineering controls



Outreach

- Program lead provides Public Pool Safety classes
- Includes response to emergency situations at public pools
- Maintains website
- Multiple handouts provided by inspectors

Contra Costa Environmental Health

Presents

Public Pool Safety

~
Spring 2016



Beginning March 29, 2016 and continuing throughout the month of April, Contra Costa Environmental Health will be hosting presentations intended to improve pool operators' understanding of pool safety and give insight into new developments pertaining to the regulation of public pools. Given the variation and distinctive operating features among residential and commercial public pools, this year's offerings will be separated into two distinct courses; one for conventional pools (*course 1*), and another for larger capacity recreational use pools (*course 2*).

COURSE 1 - <i>Swimming Pools & Spas</i> March 29th April 5th April 12th Tuesdays Designed for property managers and landlords: • Condominiums & Townhouses • Property Owner Associations • Multi-family Owned Pools • Apartments • Hotels & Motels	COURSE 2 - <i>Recreational Pools</i> April 19th April 26th Tuesdays Designed for operators and staffers of large capacity pools: • Municipal • Competitive • Health Clubs • Indoor Pools • Physical Therapy Pools • Instructional / Swim School • Agency Owned or Affiliated
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Location: Contra Costa Environmental Health
2120 Diamond Blvd., 2nd Floor Conference Room
Concord, CA 94520

Time: 9am to 12 noon

Since seating is limited, reserve your course based on your pool facility or preference.

Please RSVP by calling (925) 692-2500



ENVIRONMENTAL HEALTH DIVISION
 2120 Diamond Blvd., Suite 200
 Concord, CA 94520
 Phone: (925) 692-2500
 Fax: (925) 692-2502
www.cchealth.org/eh/

Emergency Situations – Public Pools

- Flooding
- Thunderstorms
- Tornadoes
- Power Outages

Yes, emergency situations do occur and can be brought on by unexpected events, weather catastrophe, and power outages; causing equipment failure or heavy contamination of the pool. Flood waters can carry waste and sewage. Tornadoes and lightning can injure or kill. Power outages can lead to equipment failures or malfunctions like overfeeding of chemicals at dangerous levels. Forecasting these events, identifying the problems, and developing solutions will leave you better prepared and ready to bring your pool back in safe operation. Conditions may require the evacuation of the pool during emergencies. Every facility should have procedures for clearing the pool, reporting the incident, restoring all operations, keeping track of records, and readiness for recovery.

Above all, there's no need to panic. The key word is prevention. An effective prevention program can reduce the risk of injury and help save lives through coordinated efforts between management and staff. This requires specific staff assignments and written procedures aimed at responding to emergency situations. Any delay in response may increase the risk. Being prepared will minimize that delay. This means having a contingency plan with **emergency action** included.

Contingency planning with emergency action is strongly recommended for countermeasures against potential disasters and should be site specific and customized to meet the needs of your facility, aimed at safeguarding your patrons, operations, and assets. Consult with professionals in risk management and pool service expertise for developing a plan best suited for your facility.



STATEWIDE PICTURE



Photo attribution: Alayna Shulman/Record Searchlight

2 admitted

27 evaluated at ED

→ CHILDREN'S EMERGENCY

→ Main Entrance



6 patients

1 admitted

A photograph of an outdoor emergency scene. A blue pop-up tent is set up on a grassy area. A large green tarp is laid out on the ground, where several people, including children and adults, are sitting or lying down. Some individuals are wearing high-visibility yellow safety vests. A yellow gas line runs horizontally across the background. The scene appears to be a triage or evaluation area for an emergency response.

81 evaluated at ED

Chopper 5

154 evaluated
4 admitted

BREAKING NEWS

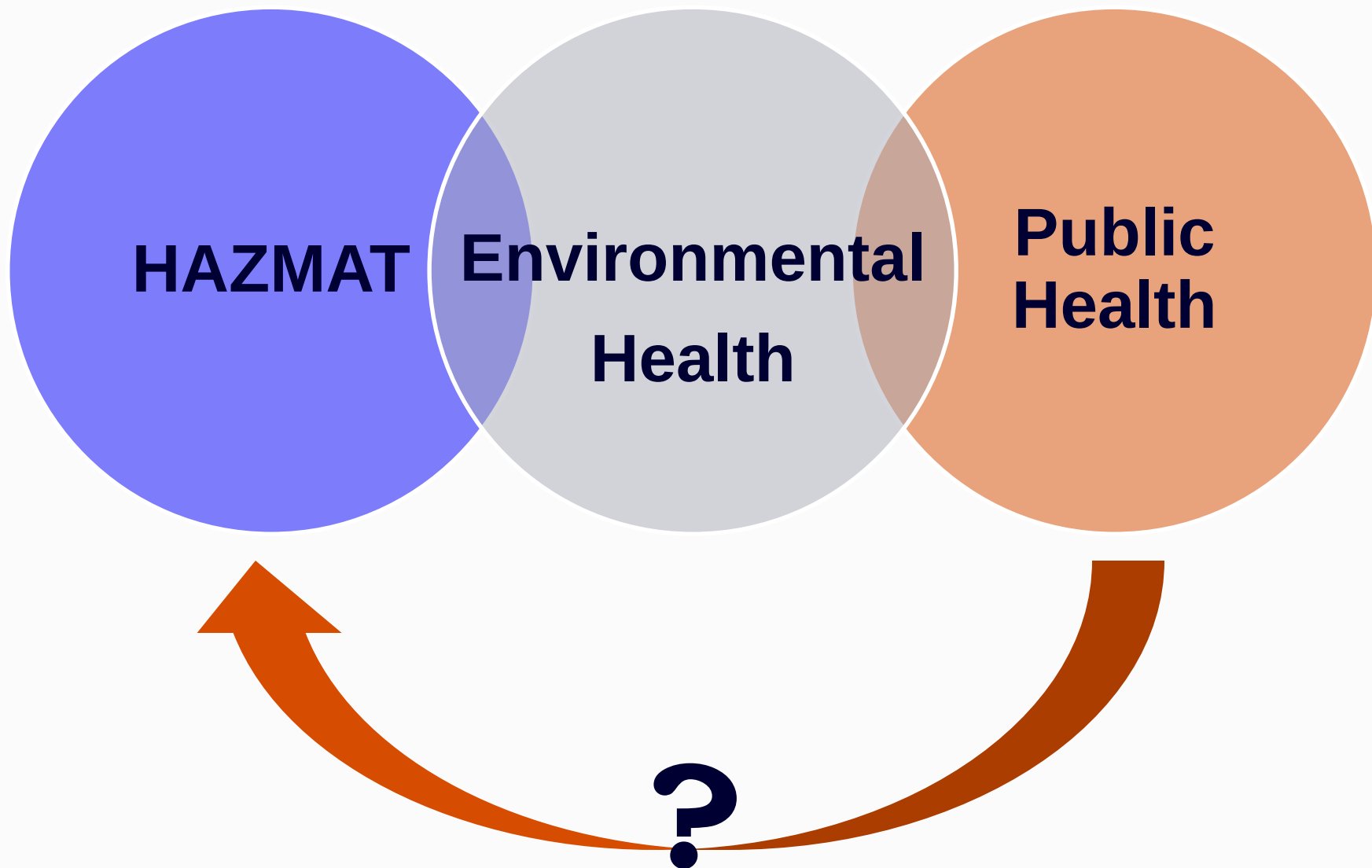
Kids Sick at Water Park

ANTIOCH

4:59 PM



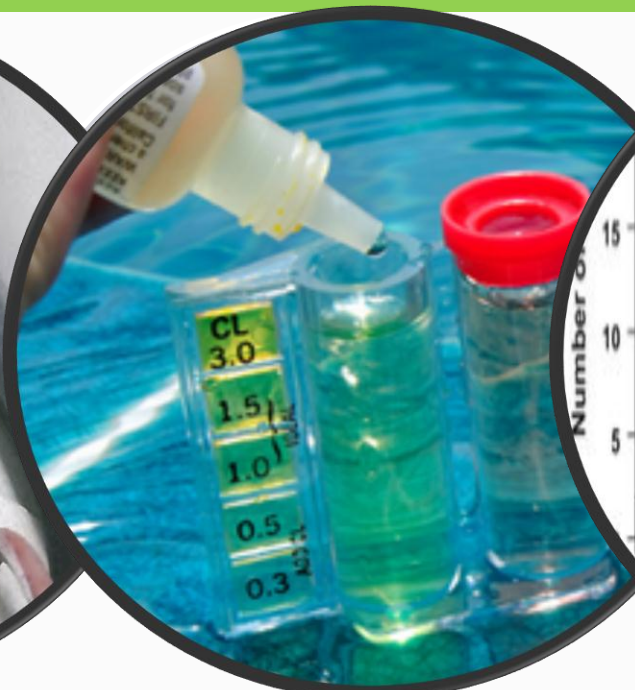
to CBS5



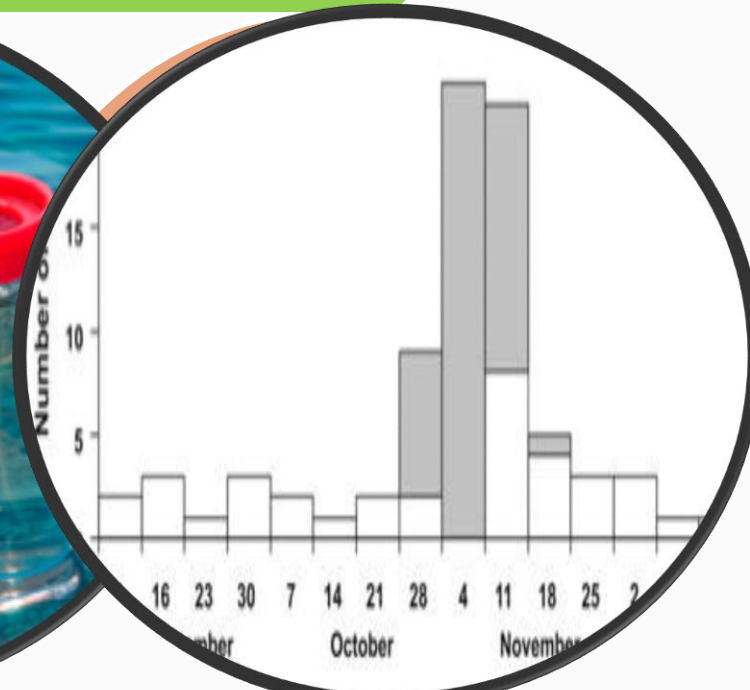
State



Regulatory



Response



Surveillance



Driven by your expertise.



Acknowledgements and Contacts

Contra Costa County

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Nino Yanga

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Michele Hlavsa

Jasen Kunz

Council for the Model Aquatic Health Code

Douglas Sackett

LT Kevin O'Connor, USCG



MODEL AQUATIC HEALTH CODE:

4.7.3.2.1.3

Interlock Controls and No or Low Flow Deactivation

All chemical feeders shall be provided with an automatic means to be disabled through an electrical interlock with at least two of the following:

- 1) Recirculation pump power,
- 2) Flow meter/flow switch in the return line,
- 3) Chemical control power and paddle wheel or flow cell on the chemical controller *if* safety test confirms feed systems are disabled through the controller when the pump is turned off, loses prime, or filters are backwashed.