Lessons Learned From Mass Chlorine Exposures at Recreational Swimming Pools

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Contra Costa County Hazardous Materials

EH₂O Recreational Waters
Overview

• Introductions/agency structure

• County investigation of Cl₂ incident

• State perspective & other incidents
17 hospitalized after possible chemical exposure at Calif. water park

- 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 bronchoalveolar 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?
Emergency Preparedness Team (EP Team)
DEOxDC EP Team Capacities

- All Hazards + Mobile Labs
- 24/7 Duty Officer
- HazMat Incident Surveillance
- Exposure Investigations
- Scientific Guidance + Technical Assistance
- Disaster Epidemiology Tools
- Resource Library
- Factsheets + Risk Communications
- Occupational H&S Guidance
Overall Fit

Local Jurisdiction: Inspections

Local Jurisdiction: Enforcement

Local Jurisdiction: Response

State: Holistic approach
Is This a Hazmat Call? Environmental Health? Or Both?
<table>
<thead>
<tr>
<th>TIME</th>
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<tr>
<td>14:29</td>
<td>First 911 Phone Call from Facility Staff</td>
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<tr>
<td>14:31</td>
<td>One Ambulance Dispatched – Code 2</td>
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<tr>
<td>14:36</td>
<td>Upgraded Ambulance to Code 3; Dispatch one Engine – Code 3</td>
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<td>14:41</td>
<td>Dispatched 2 Additional Engines – Code 3</td>
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<td>14:42</td>
<td>Engine On Scene Requests a Hazmat Response</td>
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<td>14:44</td>
<td>Hazmat Response Canceled – No Active Leak</td>
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<td>Hazmat Response Requested for Potential Leak – Code 2</td>
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<td>16:14</td>
<td>Hazmat Unit On Scene (1.75 Hours after 911 Call)</td>
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<td>16:30</td>
<td>Environmental Health Specialists On Scene</td>
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Media Coverage of the Incident
Command Structure for the Incident

Incident Commander: Battalion 8

Safety Officer: TC10

Operations Section Chief: Captain E82

Medical Group Supervisor: Captain E88

HazMat Group Supervisor: HM Specialist 23

Assist. Safety Officer HazMat: HM Specialist 22

Environmental Health: DiMaggio
5 Pools; 5 Pool Systems

Incident Command Post

Tad Pool
Sports Pool
Splash Pool
Boulder Pool
Lap Pool
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

Pool Pump Room Operation

Water is sampled at this point, and sent to control unit for analysis.

Approximate Ground Level of Chemical Room

Filtration Unit

Flow Meter

Chemical Control Unit

Peristatic Pump for Bleach

Peristatic Pump for Acid

Muriatic Acid Tank

Sodium Hypochlorite Tank

Pump Brings Water from the Pool

Approximate Pool Level

Water Returns to the Pool

*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

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**0.65 hour**

2.052916667 gallons

**3.633333333 hour**

80.66 gallons
Timeline of Pool Chemicals

June 17, 2015

- 8:00 PM: Pool Water Pump On

June 18, 2015

- 9:00 AM: Safety System Override
- 11:00 AM: First 911 Call Received at 2:29 PM

- 5:00 PM: Pool Water Pump On

The Bleach Pump is on for 241 Minutes
HCl Pump is on for 39 Minutes
Pool System Schematic

OFF 16 hours

ON 16 hours
Acid + Bleach → Cl Gas
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
STATEWIDE PICTURE
2 admitted
27 evaluated at ED
6 patients
1 admitted
81 evaluated at ED
154 evaluated
4 admitted

BREAKING NEWS
Kids Sick at Water Park
ANTIOCH
Driven by your expertise.
Acknowledgements and Contacts

Contra Costa County
Lino Ancheta
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Marilyn Underwood

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John Beckman
Svetlana Smorodinsky
Justine Weinberg

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.