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# 1,4-Dioxane in the Hicksville Community

Community Update on District's Actions Against Emerging Contaminants

October 22, 2019

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# About Our District

- Hicksville Water District regularly treats and delivers more than **2.5 billion gallons of water** to **more than 48,000 residents** every year
- We serve **more than 15,400 homes and businesses** in Hicksville, Bethpage, East Meadow, Jericho, Levittown, Syosset and Westbury in a 7.9 square-mile service territory
- More than **90% of water distributed to system** is used for purposes other than drinking

## Infrastructure

- 10 Treatment Facilities
- 14 Wells
- Two Elevated Storage Tanks
- Three grounded storage tanks
- More than 166 miles of water main
- More than 1,600 fire hydrants



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# Regulations and Testing

HWD has the responsibility to protect the public water supply in compliance with federal, state and local regulations.

Regulations require operators of public water systems to issue annual public reports to consumers identifying the contaminants present in drinking water.

We test each of our wells for more than **140 separate parameters** numerous times per year, including:

- coliform bacteria
- turbidity
- volatile organic contaminants
- inorganic contaminants
- lead and copper
- nitrates
- total trihalomethanes
- synthetic organic contaminants
- Emerging compounds ...can test it the part per trillion range!
- 1 ppb = 1 second in 32 years; 1ppt = 1 second in 32,000 years

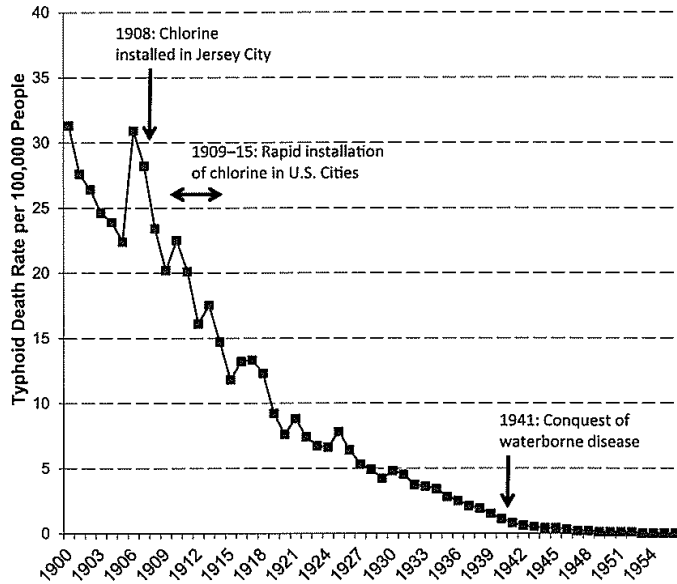


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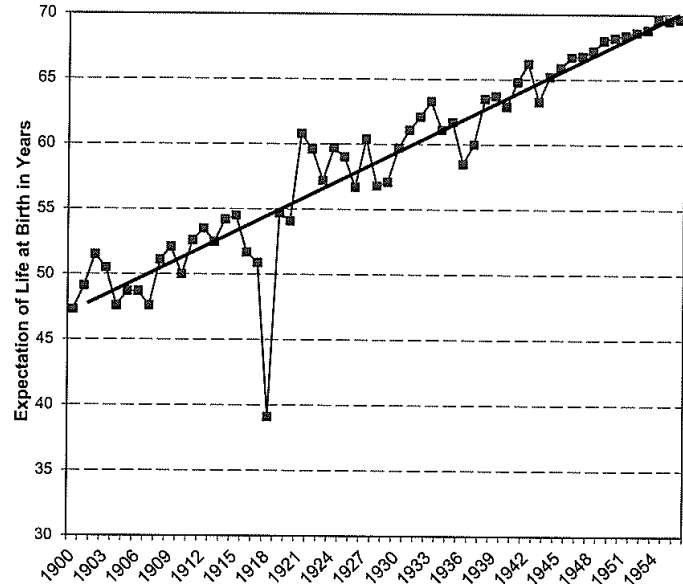




# How Safe is Our Water?



U.S. Bureau of the Census. The Statistical History of the United States from Colonial Times to the Present. Vols. 1 & 2 vols. Stamford, Connecticut: Fairfield Publishers, 1965.



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## Waterborne Disease Rates

## Life Expectancy Rates

# How Safe is Our Water?



## HOW SAFE IS OUR WATER ?

### LIFETIME RISKS OF FAMILIAR ACTIVITIES\*

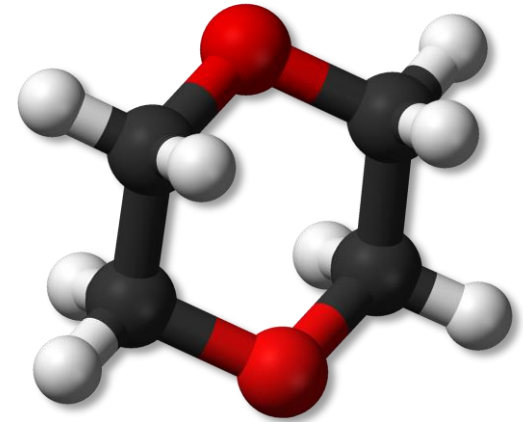
<u>Peril</u>	<u>Lifetime (70-year) Risk Per Million Population</u>
Cigarette Smoking	252,000
Construction	42,700
Police (Killed in Line of Duty)	15,400
Air Pollution (Eastern U.S.)	14,000
Motor Vehicle Accident	13,900
Home Accident	7,700
Manufacturing	5,740
Frequent Airline Traveler	3,500
Alcohol (Light Drinker)	1,400
Peanut Butter (4 lbs./day)	560
Lightning	35
Smoking 1.4 Cigarettes/Lifetime	1
U.S.E.P.A. Drinking Water Standard for Organic Constituents	1

\*Source: "Health Risk Assessment for Air Emissions of Metals and Organic Compounds from the PERC Municipal Waste to Energy Facility", Charles T. Main, Inc., December 1985.

"Risk Assessment and Comparisons: An Introduction", R. Wilson and E.A.C. Crouch, Science, April 17, 1987.

# What is 1,4-Dioxane?

- 1,4-Dioxane is a synthetic industrial chemical that is miscible in water
- This compound is typically found in conjunction with 1,1,1-Trichloroethane (TCA) because of its widespread use as a stabilizer for chlorinated solvents
- It is a by-product present in many goods, including paint strippers, dyes, greases, antifreeze and aircraft deicing fluids, and in some consumer products (deodorants, shampoos and cosmetics)
- 1,4-Dioxane remains an unregulated contaminant by US EPA standards, setting its existing MCL at 50 ppb



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# 1,4-Dioxane: Where does it come from?

In addition to industrial use, 1,4-dioxane is also prevalent in a number of cleaning products used everyday in homes. In lab tests conducted by an independent third party of the top 20 laundry brands, the following measurements were recorded:

In addition to its frequent links to manufacturing processes, 1,4-dioxane is also prevalent in a number of consumer products, including:

1. Tide (P&G) – **55,000 parts per billion (ppb)**
2. Ivory Snow Gentle (P&G) – **31,000 ppb**
3. Tide Free (P&G) – **29,000 ppb**
4. Purex (Dial Corp.) – **25,000 ppb**
5. Gain 2X Ultra (P&G) – **21,000 ppb**
6. Cheer BrightClean Detergent (P&G) – **20,000 ppb**
7. Era 2X Ultra (P&G) – **14,000 ppb**
8. Arm & Hammer (Church & Dwight Co.) – **5,000 ppb**
9. Wisk 2X Ultra (Sun Products Corp.) – **3,900 ppb**
10. Woolite Complete Detergent (Reckitt Benckiser) – **1,300 ppb**



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# More on 1,4-Dioxane and Water Quality from the Nassau County Health Department



Environmental Health

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# History of 1,4-Dioxane at HWD

- 1,4-Dioxane has been detected in **more than 70% of drinking water supply wells across Long Island**
- Sampling for 1,4-Dioxane started in 2013 as part of the EPA Unregulated Contaminant Monitoring Rule 3 (UCMR3) program
  - In Hicksville, the compound was detected at 6 of the 8 entry point samples, ranging in concentration from 0.4 ppb to 34.0 ppb
- The highest concentration of 34.0 ppb was recorded at the District's Well No. 4-2. As a result the District removed Well 4-2 from service in 2016, when results from UCMR testing results were returned
  - **The District has not used this well for the community supply since it was alerted of the results from UCMR3 three years later, in 2016**



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# 1,4-Dioxane Regulation Timeline

- 1,4-Dioxane remains an unregulated contaminant by US EPA standards, setting its existing MCL at 50 ppb
- In December 2018, the New York State Drinking Water Quality Council submitted its formal recommendation to the NYS Department of Health to regulate 1,4-dioxane at 1 ppb
- This recommendation is pending approval by the NYSDoH, with a expected timeframe for implementation as early as **March 2020**
- 18 states currently implement their own MCLs for 1,4-Dioxane
  - **5 have implemented a guideline at or below 1 ppb as proposed by NYS**
- Canada has adopted a national health standard for 1,4-dioxane of 50 ppb
  - **Michigan recently adopted an MCL of 7.2 ppb**

State	Guideline (µg/L)	Source
Alaska	77	AL DEC 2016
California	1.0	Cal/EPA 2011
Colorado	0.35	CDPHE 2017
Connecticut	3.0	CTDPH 2013
Delaware	6.0	DE DNR 1999
Florida	3.2	FDEP 2005
Indiana	7.8	IDEM 2015
Maine	4.0	MEDEP 2016
Massachusetts	0.3	MADEP 2004
Mississippi	6.09	MS DEQ 2002
New Hampshire	0.25	NH DES 2011
New Jersey	0.4	NJDEP 2015
North Carolina	3.0	NCDENR 2015
Pennsylvania	6.4	PADEP 2011
Texas	9.1	TCEQ 2016
Vermont	3.0	VTDEP 2016
Washington	0.438	WA ECY 2015
West Virginia	6.1	WV DEP 2009

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# Our District: Pumpage Capacity

## Supply:

Total District Pumpage Capacity:  
**18.7 million gallons per day (mgpd)**  
*At full capacity, with all 14 wells activated*

In peak pumpage times, the District typically utilizes **AN AVERAGE** of 10 wells

## Demand (10-year average):

Winter Pumpage (average): **5.5 mgpd**  
Summer Pumpage (average): **12.1 mgpd**  
Peak Consumption: **16.8 mgpd**  
Overall Daily Average (year-round): **7.16 mgpd**

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# 1,4-Dioxane Regulations: Local Impact

## Currently:

- 10 Wells exceeding proposed regulation of 1 ppb
- 4 wells have levels below the proposed regulation of 1 ppb
  - However, 2 of these wells have levels above what Nassau County's determination of an "actionable level" (>0.5 ppb)

Left with only these 4 wells, the District would only have **the capability to provide 7.2 mgpd—which would not allow us to reach our demand in peak demand periods, for which the District utilizes 10 wells**

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# Our District: Affected Wells AT CURRENT STANDARD

Well	Peak Detections (2017-2019)	Capacity <i>Million Gallons</i>
Well 1-4	8.4 ppb	1,400
Well 1-6	1.2 ppb	1,400
<b>Well 4-2</b>	<b>33 ppb</b>	<b>1,160</b>
Well 5-2	3.1 ppb	1,200
Well 5-3	1.8 ppb	1,200
Well 6.1	0.12 ppb	1,200
Well 6-2	0.61 ppb	1,200
Well 8-1	1.5 ppb	1,400
Well 8-3	1.4 ppb	1,400
Well 9-1	1.0 ppb	1,400
Well 9-2	1.6 ppb	1,400
Well 9-3	1.1 ppb	1,750
Well 10-1	Non Detect	1,200
Well 11-1	0.62 ppb	1,400

Below current MCL of 50 ppb.

**Total Pumpage Capacity**

**18,710**



# Our District: Affected Wells IF NEW STANDARD IS IMPLEMENTED

Well	Peak Detections (2017-2019)	Capacity <i>Million Gallons</i>	
Well 1-4	8.4 ppb	1,400	<div style="display: flex; flex-direction: column; align-items: flex-start;"> <div style="margin-bottom: 10px;"> <span style="color: red; font-weight: bold;">■</span> Exceeding proposed MCL of 1 ppb.         </div> <div style="margin-bottom: 10px;"> <span style="color: gold; font-weight: bold;">■</span> Exceeding Nassau County required action levels for contamination         </div> <div> <span style="color: black; font-weight: bold;">■</span> Below proposed MCL of 1 ppb.         </div> </div>
Well 1-6	1.2 ppb	1,400	
<b>Well 4-2</b>	<b>33 ppb</b>	<b>1,160</b>	
Well 5-2	3.1 ppb	1,400	
Well 5-3	1.8 ppb	1,400	
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Well 9-1	1.0 ppb	1,400	
Well 9-2	1.6 ppb	1,400	
Well 9-3	1.1 ppb	1,750	
Well 10-1	Non Detect	1,200	
Well 11-1	0.62 ppb	1,400	
<b>Total Pumpage Capacity</b>		<b>18,710</b>	



# 1,4-Dioxane Treatment

**Advanced Oxidation Process (AOP)** is the most promising method to remove 1,4-dioxane from groundwater resources

## How does AOP work?

1. Common treatment oxidants—typically hydrogen peroxide or chlorine—are added to raw water before it is run through a reactor full of ultraviolet lights.
2. UV light reacts with the additives to remove even the most miscible compounds in water
3. Water must then run through granular activated carbon (GAC) to remove trace elements of additive chemicals

**While this treatment method is proven to remove 1,4-dioxane in scale testing, only two systems have been approved on Long Island (1 Nassau, 1 Suffolk)**

**Took nearly 18 months for each system to receive regulatory approval**



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# Project Timeframe

## Pilot Study

Prepare Pilot Procedures	4 weeks
Health Dept. Approval	2 weeks
Conduct Pilot & Prepare Report	8 weeks
Health Dept. Approval	4 weeks

## Design Report

Preparation of Report	8 weeks
Health Dept. Approval	6 weeks

## Detail Design

Field work, survey, soil borings	4 weeks
Design	12 weeks
Health Dept. Approval	6 weeks

## Bidding Process

Advertise Period	4 weeks
Award	2 weeks
Contract Approval	4 weeks
Construction	52 weeks
Start-Up, Testing / Completed Work Approval	4 weeks

Total Project Period:  
**120 weeks**  
or  
**2.3 Years**

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# Advanced Oxidation Process: Costs

## Capital Costs

- Estimated capital costs District-wide: ~ **\$65 million**
  - Treatment systems needed at 11/14 well sites

## Annual Costs

- Bonding capital costs at 4% for 20 years: **\$4.8 million annually**
- Operation and maintenance costs: ~ **\$1.8 million annually**
- Total Costs Incurred Annually: ~ **\$6.6 million**

Current budget (2019): **\$9.8 million**

**Projected Budget with treatment: ~ \$16.4 million**

Estimated annual water rate Increase for residential customers: **81% increase**  
Estimated annual water rate increase for commercial customers: **80% increase**



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# Action By the District

## Securing Funding

- District is financially strong, however, significant amounts of funding are needed
- Secured a **\$3 million grant from NYS** for treatment upgrades at Plant 4 through Water Infrastructure Improvement Act
- Secured **\$162,300 grant from Stony Brook Center for Clean Water Technology** to support piloting costs and process

## Holding Polluters Accountable

- HWD has been in ongoing litigation to hold polluters accountable for contamination at Well 4-2.
- Have already had successful lawsuits against polluters and funding was received

## Regulatory Engagement

- HWD Superintendent is a member of the NYS Drinking Water Quality Council. The Council formulated recommended MCLs for 1,4 dioxane, PFOA and PFOS.
- HWD is currently engaged with the state and county health departments as the regulatory process moves forward.

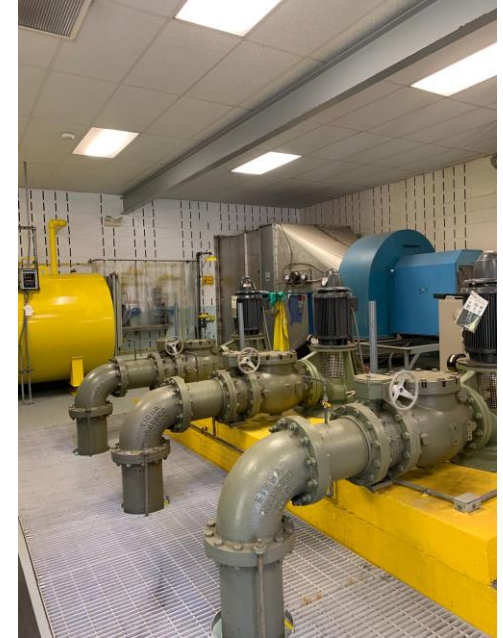


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# Interim Treatment Measures

- Passed emergency resolution allowing the District to move swiftly in preordering the necessary treatment equipment
- Currently engaged in several pilot studies to ensure the advanced treatment technology works as needed at each impacted well
- Implementing interim wellhead treatment at Plant 1 , 4 and 8 will add 9.7 MGD to system capacity and eliminate potential deficits. Board has authorized interim treatment implementation.
- Aggressive water conservation measures would still be recommended because of the loss of Plants 5 and 9 which are critical to redundancy.



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# Temporary Water Restrictions Likely in 2020

- Aggressive conservation / restriction measures will be required if a reasonable MCL implementation schedule is not adopted by NYSDOH
- All non-essential water use, including pool filling, lawn irrigating, car washing, etc., will be prohibited if implementation schedule is not adopted by NYSDOH
- District implemented moratorium on new water service connections – adopted by Board on 9/10/2019
- Unfortunately, interim importing or purchasing of water from surrounding Districts is not a viable option as they too are impacted by 1,4-dioxane



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# Conclusions

- We are facing what can be most accurately classified as a **financial crisis for water providers**.
  - The **proposed timelines** for implementation as well as the **costs of implementation** will put **heavy burdens on taxpayers** to support necessary projects.
  - Water providers will be seeking services from a **limited number of vendors** capable of facilitating work on numerous, simultaneous projects.
- While 1,4-dioxane is openly allowed to be added to our water supply by manufacturers and numerous chemical manufacturers, local taxpayers are tasked with picking up the bill for clean up.

**Water providers need assistance from elected officials in our fight on behalf of residents to ensure water rates remain consistent with historic averages, and make sure residents are not footing the bill for necessary clean up costs.**

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# Contact

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For any questions, comments, or to discuss further, we urge you to stay in contact with us for frequent updates regarding our efforts relating to 1,4-dioxane.

## Contact:

Hicksville Water District  
4 Dean Street  
Hicksville, NY 11801  
(516) 931-0184

## Board of Commissioners:

Hon. Nicholas J. Brigandi, Chairman  
Hon. William E. Schuckmann, Treasurer  
Hon. Karl M. Schweitzer, Secretary

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