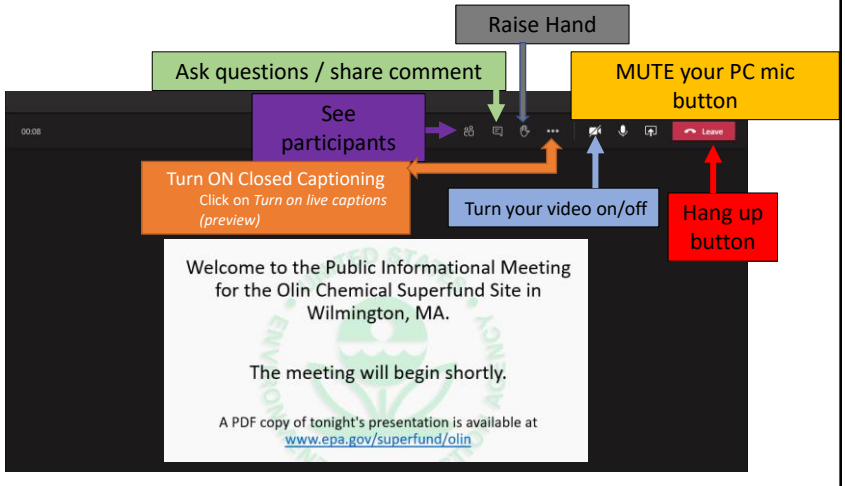
Welcome to the Public Informational Meeting for the Olin Chemical Superfund Site in Wilmington, MA.

The meeting will begin shortly.

A PDF copy of tonight's presentation is available at www.epa.gov/superfund/olin

You should hear music playing while you wait.

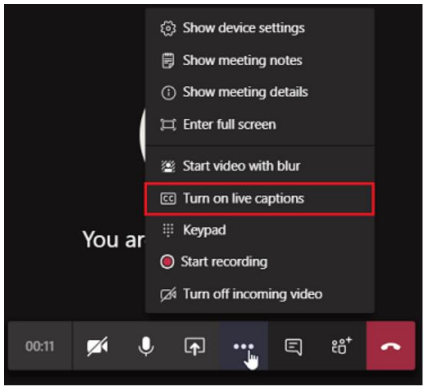
1



Microsoft Teams Meeting Controls for Participants

2

Closed Captioning



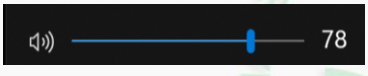
1. Once joined or in the group call, click on the *3 ellipses* (More actions)
2. Click on *Turn on live captions (preview)*
3. The closed captions will appear on the bottom left-hand side of the screen

3

Not hearing the music on your computer? Is your computer audio on?

On a PC Computer:

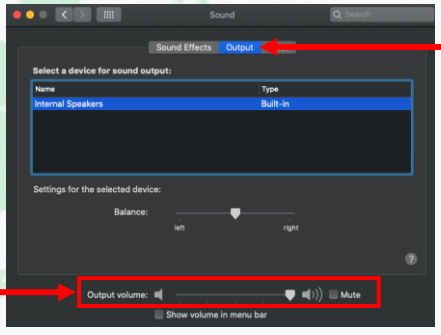
1. look for the speaker icon on your Taskbar
2. Click the icon
3. Unmute and/or increase the volume.



You should hear audio instruction on this slide

On a Mac computer:

1) Go to system preferences
2) Select the sound Icon
3) Select the Output tab
4) Choose the speakers you will be using
5) Unmute and/or increase the output volume



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Olin Chemical Superfund Site

Wilmington, Massachusetts

Public Informational Meeting
June 23, 2021

More information: www.epa.gov/superfund/olin

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Agenda

- Case Team Introductions
- Participant Instructions for the Virtual Meeting
- MassDPH Presentation
- EPA Updates
  - Schedule for Negotiations to Implement Cleanup
  - Containment Area Activities & Private Well Surveys
  - Data Gap Investigation Updates
- Other Remarks
  - Town of Wilmington
  - Wilmington Environmental Restoration Committee
- Question-and-Answer Session

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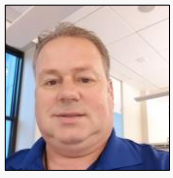
Case Team Introductions

Lynne Jennings
EPA, MA Section Chief

Melanie Morash
EPA Project Manager

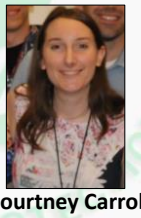
Josh Fontaine
EPA Project Manager



Jim DiLorenzo
EPA Project Manager

Bill Brandon
EPA Hydrogeologist

Chris Kelly
EPA Hydrogeologist



Courtney Carroll
EPA Risk Assessor

Bart Hoskins
EPA Risk Assessor

7

Case Team Introductions

Sarah White
EPA Community Involvement Coordinator

Man Chak Ng
EPA Case Attorney

Kevin Pechulis
EPA Case Attorney

Garry Waldeck
MassDEP Project Manager

Janet Waldron
MassDEP Project Manager

Suela John
MassDEP Case Attorney

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Options for Participating

1) Go to EPA's website and click on the link to join the Olin virtual meeting on Microsoft Teams (Note: Your computer microphone will be muted)

2) Watch on Wilmington Community Television, WCTV (Comcast Channel 9 or Verizon Channel 37)

3) To listen and/or ask questions over the phone, dial 857-299-6148 and enter code 843451080 #

Participate in the Question and Answer Session

1) Type in questions/comments in the Microsoft Teams chat window.

If dialing in by phone to ask a question,

PLEASE MUTE YOUR COMPUTER OR TELEVISION AUDIO

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Wilmington Childhood Cancer Study
Study Overview

Commonwealth of Massachusetts
Department of Public Heath

Alicia J Fraser, DSc
Director, Environmental Epidemiology
Bureau of Enironmental Health
alicia.fraser@mass.gov

EPA's Olin Chemical Superfund Site Informational Town Meeting
June 23, 2021

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ACKNOWLEDGEMENTS

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Community Engagement

- Concerned Residents
- Community Groups
  - Kelly Hill Group
  - Wilmington Childhood Cancer Study Advisory Committee
  - WERC
  - Families impacted by childhood cancer
- Wilmington Board of Health (BOH)
- State Representative James Miceli

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Technical Contributions

- Engineering Consultants
  - John Durant
  - Bruce Jacobs
  - Jeff Walker
  - Peter Shanahan
  - Jayne Knott
- Wilmington Water & Sewer Division
- MA DEP
- US EPA
- Peer Reviewers
  - Morris Maslia
  - Noelle Selin
  - Mary Ward

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STUDY BACKGROUND

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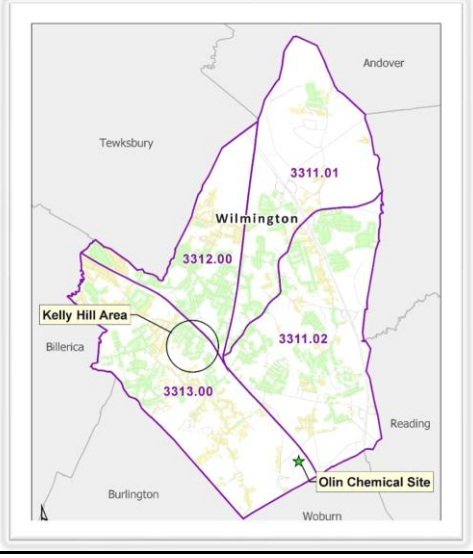
Wilmington Census Tract Map and Locations of Interest



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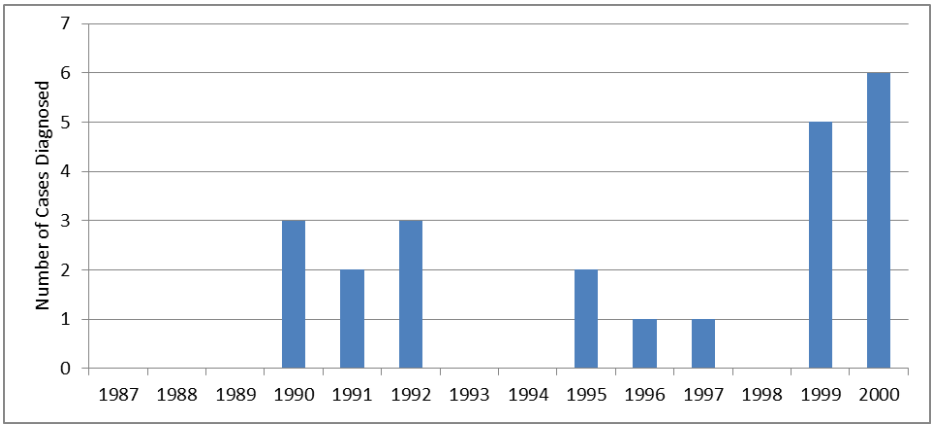
Childhood Cancer Cases
Wilmington, MA, 1987-2000



Expected Case Count Is ~1/Year

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Environmental Contaminants

- In 2003, a carcinogenic compound (**n-nitrosodimethylamine or NDMA**) was found in the groundwater supplying part of the town's public drinking water. The contaminated supply wells were brought off-line.
  - Olin Chemical Site (1953-1986)
- The study shifted focus to concentrate on the potential for historical exposure to NDMA and whether such exposure may be related to childhood cancer incidence.
- Another carcinogenic chemical, **trichloroethylene or TCE**, was previously present in the water supply during part of the study period, and the study evaluates the potential role of TCE exposure, as well.

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METHODS OVERVIEW

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Participant Selection

Case / Control Design

- 18 cases participated out of 21 eligible
  - 11 leukemia/lymphoma
  - 12 boys, 6 girls
- 74 controls matched on age and sex
  - ~5 per case
- Interviews with each participant
  - Full family medical history, residential history, health behaviors such as alcohol and cigarette use, occupational and residential exposure potentials

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Exposure Assessment

- Historical Drinking Water Concentration Modeling
  - Groundwater flow model
  - Contaminant fate and transport model
  - Public drinking water distribution system model
- Estimated monthly concentration at the tap
  - NDMA (1974-2000)
  - TCE (1981-2000)
- Etiologic Periods
  - Maternal (in-utero): During the year prior to birth
  - Childhood: From birth to diagnosis or reference date

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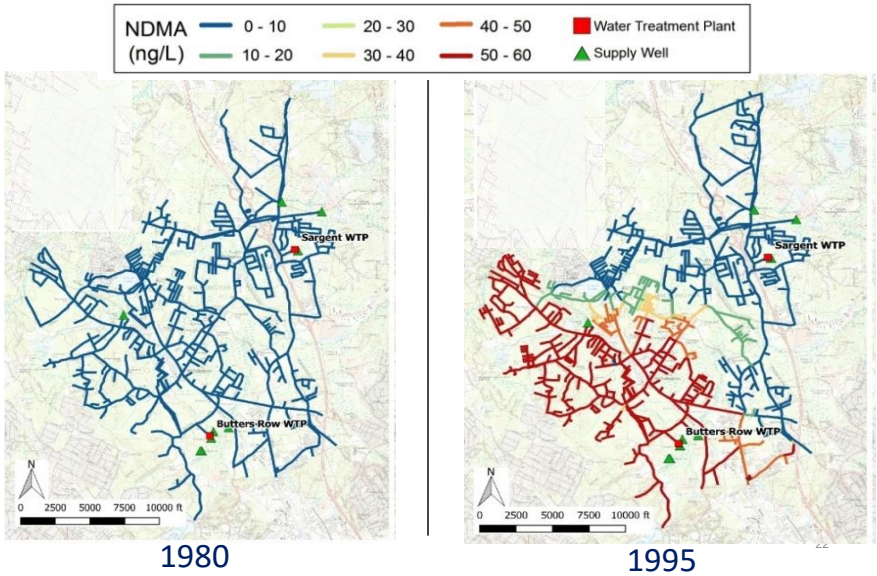
NDMA Concentrations by Pipe, 1980 and 1995



1980 1995

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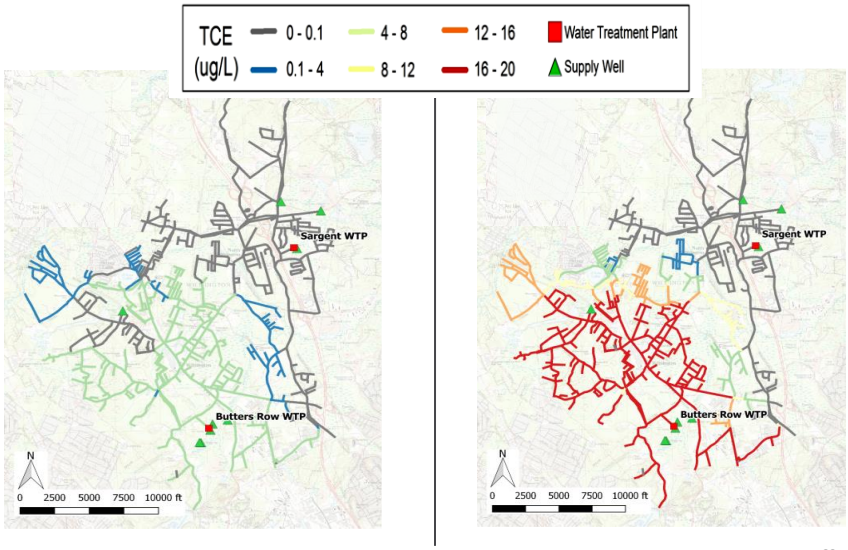
TCE Concentrations by Pipe, 1983 and 1985



1983 1985

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Analysis

- Exposure Metric
  - Average of all non-zero modeled monthly concentrations of NDMA or TCE
  - Dichotomous (ever/never)
  - Categorical (zero/low/high)
- Cancer Type Groupings
  - All Cancers
  - Leukemia/Lymphoma
- Primary home drinking water source
  - Bottled or Tap, asked per residence
  - Available for maternal analysis only
- Other Risk Factors

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Risk Factors Evaluated

- Length of residence in Wilmington
- Mother's education
- Family history of cancer
- Prenatal Factors
  - Maternal age at birth
  - Vitamin use
  - Smoking
  - Alcohol intake
- Pregnancy exposures
  - Diagnostic x-ray
  - Mononucleosis
  - Ultrasonography
  - Ionizing radiation
- Adverse Birth Events
  - Given oxygen
  - Placed in incubator
  - Low or high birth weight
- Child's history
  - Breastfed
  - Mononucleosis
  - Antihistamine use
- Household Exposures
  - Second-hand smoke
  - Bug repellent or pesticides
  - Metals, alloys, solders
  - Plastics, synthetics, resins
  - Exhaust fumes
  - Herbicides

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Statistical Inference

- Odds Ratios (OR)
  - 1.0 = No association
  - Larger than 1.0 = Positively association
  - Smaller than 1.0 = Negative association
- 95% confidence intervals
  - A measure of reliability and precision of the OR
- *P*-values
  - < 0.05 -- Statistically significant
  - < 0.10 -- Marginally significant
- **Other Considerations:**
  - **Dose-response trends**
  - **Consistency in the results**
  - **Plausibility based on the scientific literature**
  - **Potential impact of any confounding, measurement error, or bias**

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STUDY RESULTS

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"Ever/Never" NDMA in drinking water and odds of childhood cancer, 1974-2000

	Cases v. Controls	OR	P-value
<u>All Cancers</u>			
Maternal	50% v. 34%	**2.2**	**0.18**
Childhood	78% v. 84%	0.7	0.55
<u>Leukemia/Lymphoma</u>			
Maternal	64% v. 36%	**2.9**	**0.12**
Childhood	73% v. 84%	0.5	0.38

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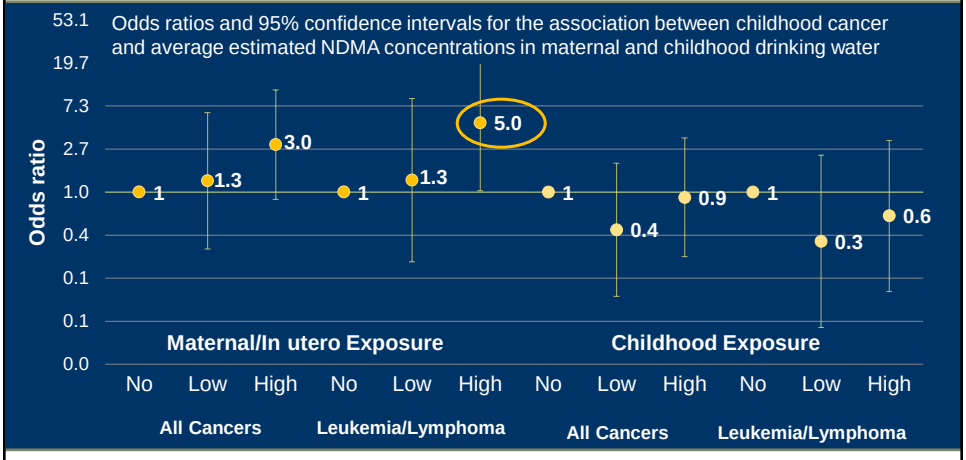
Categories of NDMA Concentrations and Odds of Childhood Cancer, 1974-2000



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TCE Concentrations and Odds of Childhood Cancer, 1981-2000

- Maternal Exposure
  - Ever/Never
    - Any Cancer type OR = 2.3 (p=0.32)
    - Leukemia or Lymphoma OR = 1.7 (p=0.55)
  - Categorical Analysis
    - Any Cancer type LOW vs. NO exposure OR = 4.2 (p=0.26)
    - Leukemia or Lymphoma LOW vs. NO exposure OR = 1.9 (p=0.51)
- Childhood TCE Exposure
  - No evidence of a positive association

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CONCLUSIONS

Key Findings

- Despite limitations, including a small sample size and modeled exposure estimates, study results show an association between childhood cancer and prenatal exposure to NDMA, or NDMA and TCE.
- This association is observed consistently in a series of analyses and the results are statistically significant with respect to the subset of leukemia or lymphoma diagnoses.
- These associations exhibit a dose-response trend in which higher estimated exposures result in higher odds of cancer.
- The associations remained positive even after adjustment for other known risk factors.
- For exposure to NDMA or TCE during childhood, however, there was no evidence of an increased odds of cancer.

Additional Notes

- Childhood cancer incidence in Wilmington returned to expected rates beginning in 2001 and DPH will continue to monitor all childhood cancer diagnoses in Wilmington.
- Note that 50% of children with cancer in the study were estimated to have experienced no exposure to NDMA or TCE and 34% of control children were exposed to one or both contaminants. The study's findings are most appropriately understood as a possible increase in risk on a population level rather than a determination of causation at an individual level.
- Wilmington's public drinking water is no longer contaminated with NDMA or TCE and currently poses no known risk to health.
- Olin Chemical is an active Superfund Site managed by the US Environmental Protection Agency (EPA).

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THANK YOU

CONTACT:
ALICIA.FRASER@MASS.GOV

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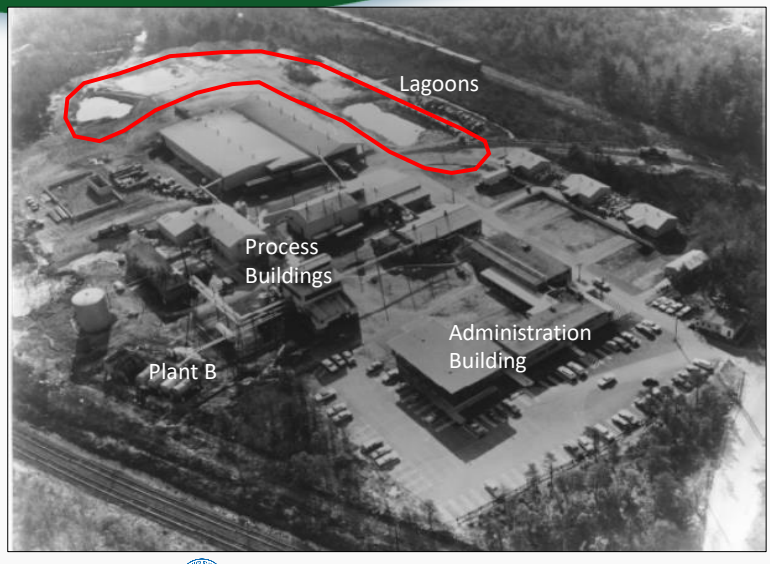
EPA Updates www.epa.gov/superfund/olin



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Human Health and Ecological Risks

Human Health Risks

- Risk if groundwater used for drinking water (affected town wells placed off-line in 2002)
- Risk from soil contamination if the property were to be used for residential
- Indoor air risk in certain areas of the property if buildings constructed in the future
- Risk to trespassers from contact with water in streams

Ecological Risks

- Soil in certain areas poses risks to birds and small mammals
- Sediment in the streams poses risks to aquatic invertebrates and insect-eating birds
- Surface water contamination poses risks to aquatic invertebrates

Green Frog

Photo provided by Nobis Engineering, Inc.

American Robin

https://www.audubon.org/field-guide/bird/american-robin

Marsh Wren

https://www.audubon.org/field-guide/bird/marsh-wren

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EPA's Cleanup Plan

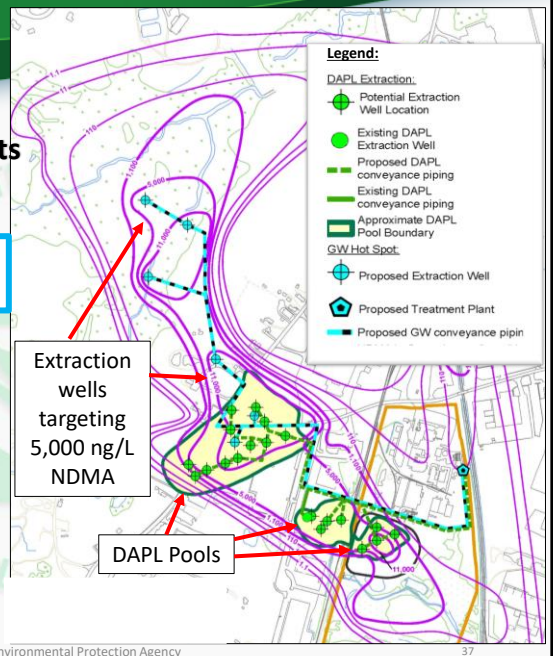
Interim Action – DAPL & Groundwater Hot Spots

DAPL and Groundwater Hot Spot extraction and treatment

Notes:
Well placement may be modified during the remediation design phase

DAPL = Dense Aqueous Phase Liquid

NDMA = n-nitrosodimethylamine



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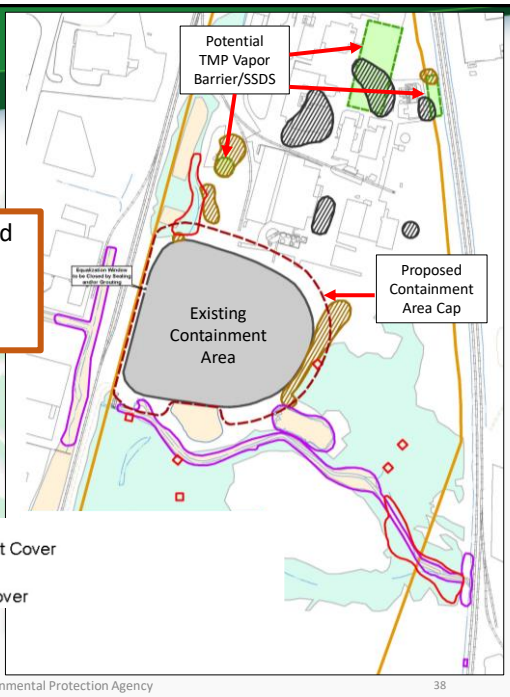
EPA's Cleanup Plan

Final Action – Soil & Sediments

Caps and cover systems, excavation and restoration of wetland soil and sediments, Institutional Controls to protect for vapor intrusion

Notes:
SSDS = sub-slab depressurization system

TMP = trimethylpentenes



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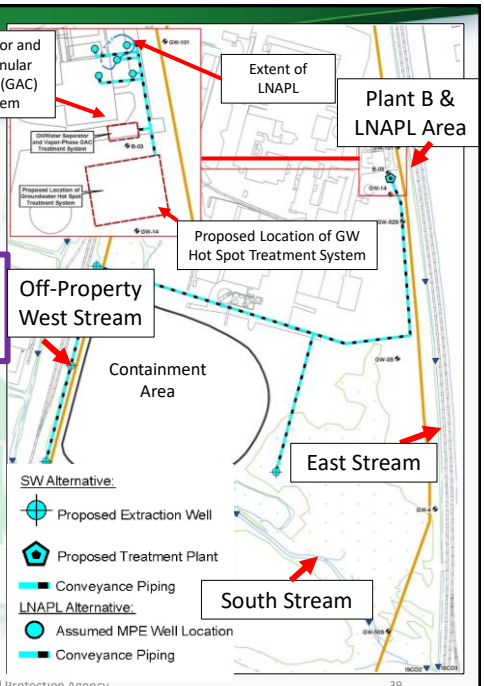
EPA's Cleanup Plan

Final Action –
LNAPL & Surface Water

Targeted groundwater extraction to prevent discharge to the streams, multi-phase extraction (MPE) for LNAPL

Note:
Well placement may be modified during the remediation design phase

LNAPL = Light Non-Aqueous Phase Liquid



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ROD Cost Estimates

- DAPL and GW Hot Spots - $35.5 million
- LNAPL and Surface Water - $6.6 million
- Soil and Sediments - $6.1 million
- Total - **$48.2 million**

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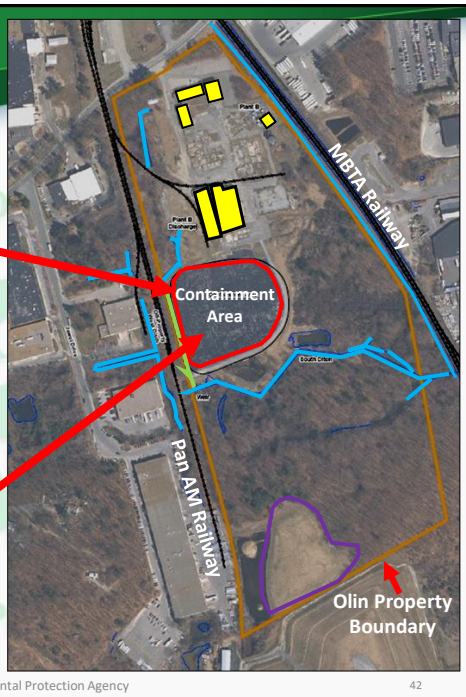
Negotiations to Implement the Cleanup

Negotiating the Design and Implementation of the Cleanup

- In June 2021, issue Special Notice letters inviting RPs to negotiate to conduct the cleanup
- By September 2021, RPs must provide good faith offer to perform work or pay for cleanup
- Goal of March/April 2022 to complete negotiations and enter enforcement agreement
- Throughout 2022, work with RPs to design the remedy

Containment Area Updates



Containment Area Updates

- Breach in the cap in November 2020
- Since November 2020, Olin has been required to repair and frequently inspect the cap until a more robust temporary cap is installed
- Construction of the replacement temporary cap scheduled for late summer/fall


Cap Breach


Patching of the Cap

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Temporary Cap Upgrades

Upgrades to the replacement temporary cap include:

- Importation of clean fill and regrading to a minimum 2% slope
- Upgrading of the geomembrane liner from the 6-mil and 8-mil polyethylene liner to a 60-mil texturized HDPE liner
- Construction of interior and perimeter anchor trenches to secure the temporary cap without needing sandbags
- Installation of a 10-foot chain link fence to prevent wildlife from walking over and tearing the new temporary cap

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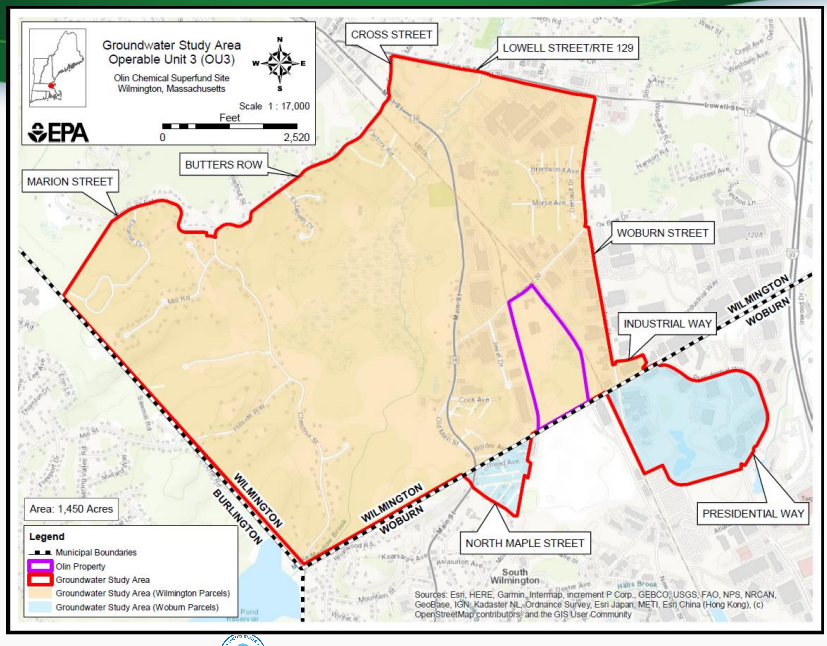

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Private Well Surveys and Sampling

- EPA required that Olin prepare a Work Plan to identify and sample additional private wells within the Groundwater Study Area (GSA)
  - Private well sampling of any private wells within the (GSA
  - Private well surveys to locate any unidentified wells within the GSA
- 36 private wells within the Groundwater Study Area (GSA) have been historically sampled
- 20 wells are currently sampled quarterly

Example Private Well

If you live within the GSA boundary and would like your private well sampled, please contact EPA at fontaine.joshua@epa.gov or 617-918-1720

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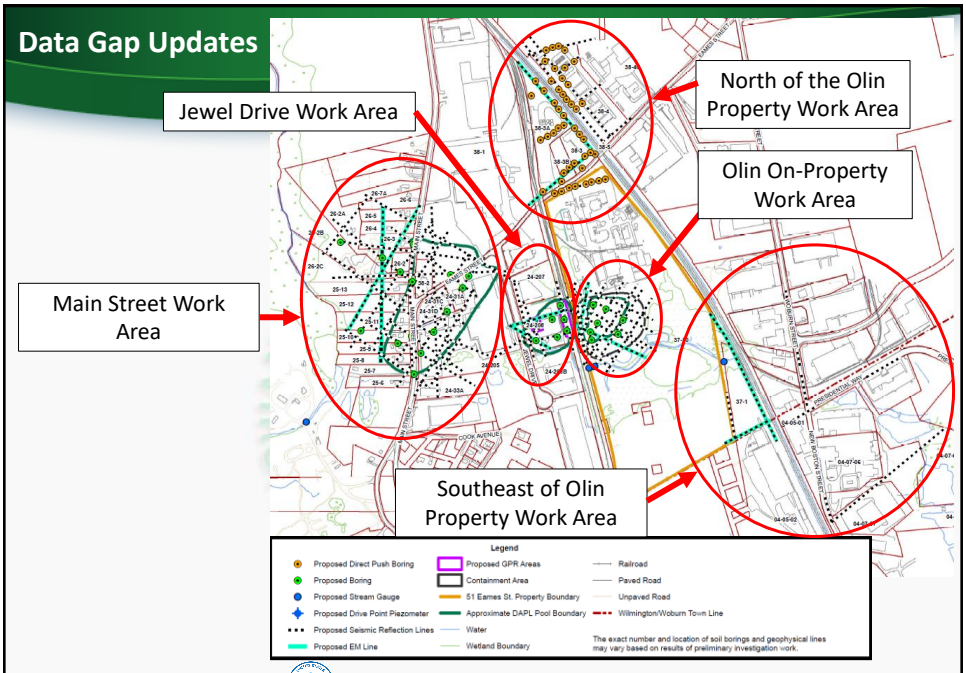
Data Gap Updates



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Data Gap Updates

Geophysical Investigations (Phase 1A)

Seismic Reflection/Refraction

Low Frequency Ground Penetrating Radar

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Data Gap Updates

Subsurface Investigations (Phase 1B)

Track Mounted Drill Rig

Soil borings (~3 inches in diameter)

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Data Gap Updates

Near-Term Schedule for Initiating Phase I Off-Property Work:

Jewel Drive Work Area: **June 2021**

Main Street Work Area: **July 2021**

North of Olin Property Work Area: **July/August 2021**

Southeast of Olin Property Work Area: **August 2021**

- Schedule for additional Data Gaps Phases will be communicated at a later date.

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Contacts for More Information
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EPA Contacts

Melanie Morash
Project Manager
(617) 918-1292
morash.melanie@epa.gov

Josh Fontaine
Project Manager
(617) 918-1720
fontaine.joshua@epa.gov

Chris Kelly, PG
Hydrogeologist
(617)918-1382
kelly.christopher@epa.gov

Sarah White
Community Involvement Coordinator
(617)918-1026
white.sarah@epa.gov

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Contacts for More Information
www.epa.gov/superfund/olin

Additional Contacts

Garry Waldeck, Project Manager
Massachusetts Department of Environmental Protection
garry.waldeck@state.ma.us

Alicia J Fraser, Director,
Env. Epidemiology Program
MA Dept. of Public Health
(617) 624-5757
alicia.fraser@mass.gov

Jeff Hull
Wilmington Town Manager
(978) 658-3311
jhull@wilmingtonma.gov

Mike Woods
Wilmington Public Works Dir.
(978) 658-4711
mwoods@wilmingtonma.gov

Shelly Newhouse
Wilmington Health Dept.
(978) 658-4298
boh@wilmingtonma.gov

Martha Stevenson, Pres.
Wilmington Environmental Restoration Committee
wilmingtonerc@gmail.com

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Question and Answer Session

- Questions/comments may be entered in the MS Teams chat window.
- To ask a question over the phone, call **857-299-6148** and enter code **843451080 #**.
- For those dialing in by phone, raise your hand "virtually" by dialing *9; to mute/unmute your phone, dial *6.
- **PLEASE MUTE YOUR COMPUTER OR TELEVISION BEFORE YOU SPEAK**.

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fontaine.joshua@epa.gov

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Community Involvement Coordinator
(617) 918-1026
white.sarah@epa.gov

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