

Proposed Amended Record of Decision

Naval Weapons Industrial Reserve Plant (U.S. Navy) and Northrop Grumman Bethpage Facility Sites

June 10, 2019

Agenda

Introduction & Meeting Ground Rules

Bill Fonda, Citizen Participation Specialist, DEC

Project Overview and Remedial Process

Martin Brand, Deputy Commissioner, DEC

Long Island Aquifer & Site History

Jason Pelton, Project Manager, DEC

Expanded Investigation, Groundwater Modeling, & Feasibility Study

Dan St. Germain, Hydrogeologist, HDR

Proposed Remedy

Jason Pelton

Exposure Assessment

Steve Karpinski, Public Health Specialist, NYSDOH

Meeting Recap Martin Brand

Questions and Answers



Expanded Engineering Investigation

- In 2017 Governor Cuomo directed DEC to complete expanded investigation
 - Supplement 2016 HDR report
- Evaluate options to hydraulically contain the Navy Grumman Plume
- Partnership with HDR and USGS
 - USGS groundwater flow modeling
 - HDR database development, plume shell development and engineering analysis

Conservation

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Goals of the Plume Remediation

- Full hydraulic containment of Navy Grumman Plume
- Prevent further expansion of Navy Grumman Plume
- Reduce volume and contaminant concentrations, cleanup timeframe
- Minimize impacts to public water supply wells
- Treat water to meet all standards
- Protect Long Island aquifer by returning majority of treated water back to aquifer system
- Minimize impacts to the environment



DEC Remedy Selection Process

1. Expanded Investigation – collect and evaluate data

2. Feasibility Study – evaluate cleanup options

3. <u>Proposed Amended Record of Decision (AROD)</u> – **Now** presents proposed cleanup option

Long Island Aquifer



Drinking water source for about <u>3 Million</u> Long Islanders

<u>Equates to</u>: ~270 Million Gallons Daily





Groundwater

Commonly occurs in pore spaces between sand and gravel

Not in Underground Lakes or Reservoirs

~300 Feet Per Year Not Feet Per Second

Three AquifersUpper GlacialMagothyLloyd



Site Location – Zoomed In



- Former NWIRP (blue)
- Former Northrop Grumman (orange)
 - Groundwater Plume
 - 4 miles long
 - 2 miles wide
 - Up to 800 feet deep

Primary Contaminant: TCE



Existing Records of Decision (RODs)

- 1. 1995 Navy and Northrop Grumman ROD On-Site Soils
- 2. 2001 Navy and Northrop Grumman RODs Groundwater
- 3. 2003 Navy ROD Groundwater
- 4. 2013 Northrop Grumman ROD Bethpage Community Park Soil and Groundwater
- 5. 2018 Navy ROD Site 1 Soil and Groundwater



Location, History, and Ongoing Cleanup



- 3 related plumes
- 11 pumping wells

 ~7 million gallons/day
 >200,000 lbs
 contamination removed
- Wellhead treatment at 6 public water supplies
- 16 threatened public water supply wells



Current Plume Cleanup

- <u>Source Removal</u>:
 - On-site containment with pumping wells
 - Soil treatment and removal at former ballfield
 - Soil removal from former drum marshaling area
 - Soil vapor extraction systems
- <u>Northrop Grumman</u>: off-site hot spot
- <u>Navy</u>: off-site hot spot



Expanded Engineering Investigation Four Major Tasks:

- 1) Investigation and fast track extraction wells
- 2) Database and plume shell development
- 3) Groundwater flow modeling
- 4) Feasibility study



Investigation Program

- Installed wells at locations along leading edge of plume
- Fill-in data gaps
- Drilled to bottom of aquifer (>1,000 ft)
- Collected groundwater samples to define plume
- Installed 3 monitoring wells



Fast-Track Extraction Wells

- Drilling began early 2018 at direction of Governor Cuomo
- Drilling at 5 locations
- 3 pumping wells installed
- 4th pumping well site preparations underway





Database & Plume Shells

- Contaminants of Concern
 - Industrial solvents used to clean parts during manufacturing - Chlorinated Volatile Organic Compounds (e.g., TCE)
 - Refrigeration chemicals (e.g., Freon)
 - Solvent stabilizer (e.g., 1,4-Dioxane)

Comprehensive Database

- >200,000 individual lab results and >5,500 groundwater samples
 - Navy
 - Northrop Grumman
 - NYSDEC
 - NCDOH



Older Plume Rendition



Current Plume Mapping









Side-Views & Cross-Sections





TCE Plume – Side View (Looking East)



TCE Plume – Side View (Looking East)



TcVOC Plume – Cross-Section (Looking East)



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TcVOC Plume – Cross-Section (Looking East)



USGS Groundwater Flow Model

- Island-wide model to evaluate water resources of Long Island
- Framework for defined focused model
- Focus Area Model
 - 25 layers
 - 100 x 100 foot cells (250 columns x 346 rows)
 - Physical aquifer properties and boundary conditions from regional model
 - Local model calibrated using parameter estimation techniques
 - >2,000,000 cells in model



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USGS Groundwater Flow Model

- Plume Shells combined with Groundwater Model
- Particle starts within each cell
- Model calculates path from starting cell to extraction wells
- Pumping rates, well locations, and recharge basin locations iteratively adjusted to hydraulically contain the plume
- Evaluation of potential effects to environment



Groundwater Model Verification

Water levels and stream flows are observed in the field, then compared with simulated values







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Feasibility Study

- Detailed evaluation of remedial alternatives.
- Technical basis for the DEC's selection of the proposed site remedy.
- Supports the development of an Amendment to the Record of Decision.





Remedy Evaluation Criteria

- 1. Protection of Human Health & the Environment
- 2. Compliance with NYS Standards, Criteria, and Guidance
- 3. Short-term effectiveness
- 4. Long-term effectiveness and permanence
- 5. Reduction of toxicity, mobility, or volume
- 6. Implement-ability
- 7. Cost effectiveness
- 8. Land use
- 9. Community acceptance



Remedial Alternatives

Alternative 1	No Further Action (existing and planned remedial systems)			
Alternatives 2A & 2B	Hydraulic containment of Site Contaminants above Standards			
Alternatives 3A & 3B	Plume Mass Flux Remediation			
Alternative 4	Aquifer Flushing			
Alternatives 5A & 5B	Hydraulic Containment of Site Contaminants above Standards, Criteria, and Guidance Combined with Mass Flux Remediation			

Note: Evaluation of No Further Action Alternative Required by Statute.

Alternatives 2, 3, and 5 were developed with "A" and "B" variants

"A" variants utilized decentralized treatment/recharge systems close to extraction wells

"B" variants utilized larger, centralized treatment systems.





Alternative 1 – No Further Action

- Existing and planned remediation systems
 - ONCT
 - BPGWCS Already Operating
 - GM-38
 - RW-21 Area System
- Planned
- RE-108 Area System
- No hydraulic containment of plume







Alternative Comparison 38									
Alternative 1	Alternative 2A	Alternative 2B	Alternative 3A	Alternative 3B	Alternative 4	Alternative 5A	Alternative 5B		
No Further Action (With Existing & Planned Remedial Systems)	Hydraulic Containment of Site Contaminants above SCGs - Decentralized Treatment Plants with Various Discharge Methods	Hydraulic Containment of Site Contaminants above SCGs - Centralized Treatment Plants with a Centralized Recharge Basin	Plume Mass Flux Remediation - Decentralized Treatment Plants with Various Discharge Methods	Plume Mass Flux Remediation - Centralized Treatment Plant with a Centralized Recharge Basin	Aquifer Flushing	Hydraulic Containment of Site Contaminants above SCGs Combined with Mass Flux Remediation - Decentralized Treatment Plants with Various Discharge Methods	Hydraulic Containment of Site Contaminants Above SCGs Combined with Mass Flux Remediation - Centralized Treatment Plants with a Centralized Recharge Basin		
-	Decentralized	Centralized	Decentralized	Centralized	Decentralized	Decentralized	Centralized		
-	Recharge Basins Surface Water	Recharge Basins Beneficial Reuse Surface Water	Recharge Basins Beneficial Reuse	Recharge Basins Beneficial Reuse	Injection Wells	Recharge Basins Beneficial Reuse Surface Water	Recharge Basins Beneficial Reuse Surface Water		
0	16	16	17	16	23	24	24		
0	14.9	13.2	13.1	10.3	12.5	19.2	17.5		
: -	\$210,206,000	\$194,894,000	\$233,987,000	\$168,475,000	\$313,879,000	\$282,959,000	\$240,448,000		
\$	\$326,442,000	\$272,890,000	\$274,424,000	\$151,022,000	\$277,374,000	\$440,803,000	\$320,297,000		
- \$	\$553,249,000	\$484,895,000	\$522,410,000	\$331,712,000	\$608,390,000	\$747,935,000	\$584,650,000		
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Proposed Alternative

<u>Alternative 5B</u>: Hydraulic Containment of Site Contaminants above SCGs Combined with Mass Flux Remediation - Centralized Treatment Plant with a Centralized Recharge Basin remedy



Proposed Alternative – Northern Half Conceptual Layout







Proposed Alternative – Southern Half Conceptual Layout



Role of the NYS Department Of Health

- Work with NYSDEC to identify nature and extent of contamination to evaluate potential exposures
- Evaluate data and make recommendations to address any potential exposure
- Ensure that remedy selected is protective of public health



What is exposure?

- Physical contact with a chemical or substance
 - Inhalation (breathing)
 - Direct contact (touching)
 - Ingestion (eating/drinking)
- One or more of these physical contacts <u>must</u> occur before a chemical has the *potential* to cause a health problem
- Exposure does not necessarily mean that health effects will occur



Potential Exposure Pathway

Ingestion

The ingestion exposure pathway for contaminated groundwater is not an immediate public health concern as the area is served by Public Water Systems and drinking water meets the United States Environmental Protection Agency (EPA) and New York State Department of Health (DOH) drinking water standards. Many public water systems on Long Island endeavor to remove even the lowest concentrations of trace contaminants.

The Public Water Supply Contingency Plan has been developed to help ensure that these objectives continue to be achieved.



NORTHROP GRUMMAN/NAVAL WEAPONS INDUSTRIAL RESERVE PLANT FACILITIES Health Consultation

• For further questions on the Health Consultation, health effects or to provide comments, please see New York State Department of Health representatives at the availability table



New York State Department of Health Contact Information

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New Plan Achieves Remedial Goals

- Full Hydraulic Containment of Navy Grumman Plume
- Prevent Further Expansion of the Navy Grumman Plume
- Reduce the Volume and Contaminant Concentrations and Reduce Cleanup Timeframe
- Minimize Impacts to Public Water Supply Wells
- Treat Water To Meet All Standards
- Protect Long Island Aquifer by Returning Majority of Treated Water Back to the Aquifer System
- Minimize Impacts to the Environment

Comparison of Modeling Results Current Remedy Proposed Remedy



Take Away Points

Full hydraulic containment is feasible

Proposed remedy will prevent further migration

Proposed remedy will protect water supplies



Conservation

Next Steps

Activity	Estimated Time
1) Public Comment Period	May 23 – July 7, 2019
2) Issue Record of Decision (ROD)	July/August 2019
 Demand Potentially Responsible Parties (PRPs) to implement 	Immediately After ROD
4) Remedial Design	Immediately After ROD
5) Construction	Determined by Remedial Design

Thank You



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