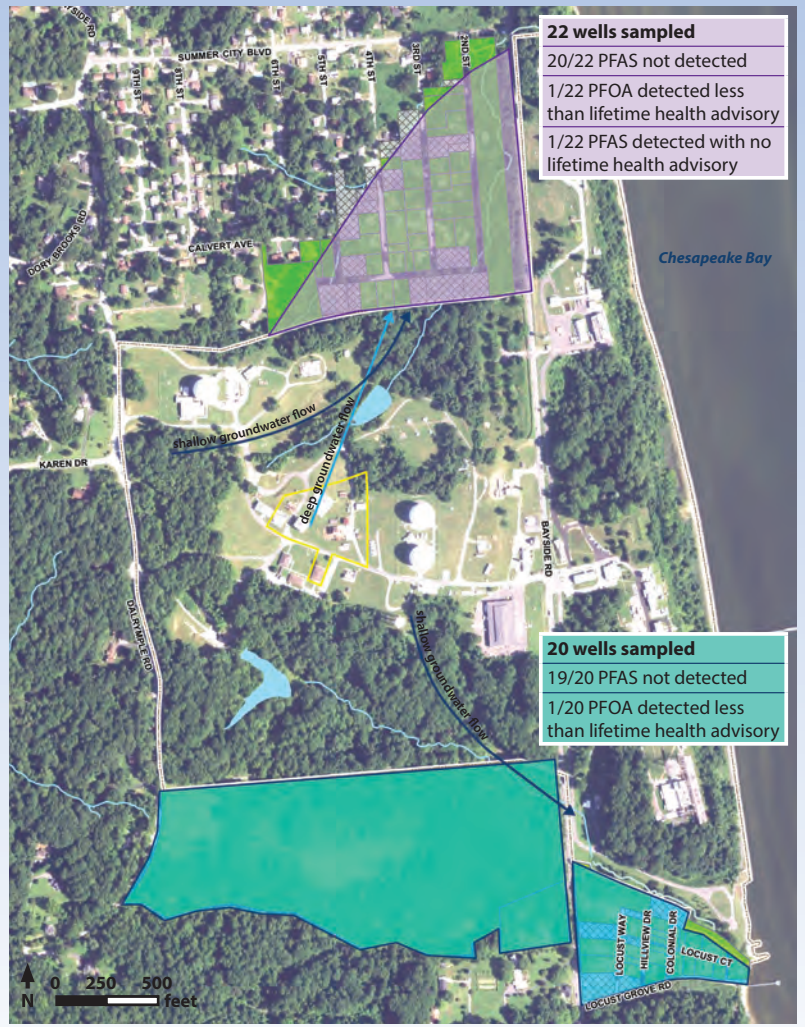
PFAS Drinking Water Results near NRL-CBD

Additional information can be found online at **www.secnav.navy.mil/eie/pages/pfc-pfas.aspx**

For updates as more information becomes available, visit (case sensitive) **https://go.usa.gov/xQFuw/**

If you have specific questions, please contact **NRLCBDWATER@navy.mil** or **1-855-NRLCBD1 (1-855-675-2231)**



- **42** drinking water samples were collected.
- PFAS were not detected in **39** samples.
- PFAS were detected in **3** samples. PFOA was detected in **2** of these samples.
- **No results were above the EPA lifetime health advisory.**
- The on-base PFAS investigation continues.
  - These results will help direct future off-base sampling.

LEGEND

- Sampling area
- Developed parcel in sampling area
- Undeveloped parcel in sampling area
- Fire Testing Area (suspected source)
- Surface water
- NRL-CBD boundary

EPA U.S. Environmental Protection Agency
NRL-CBD Naval Research Laboratory – Chesapeake Bay Detachment
PFAS per- and polyfluoroalkyl substances
PFOA perfluorooctanoic acid
PFOS perfluorooctane sulfonate
ppt parts per trillion

PFAS Drinking Water Results near NRL-CBD

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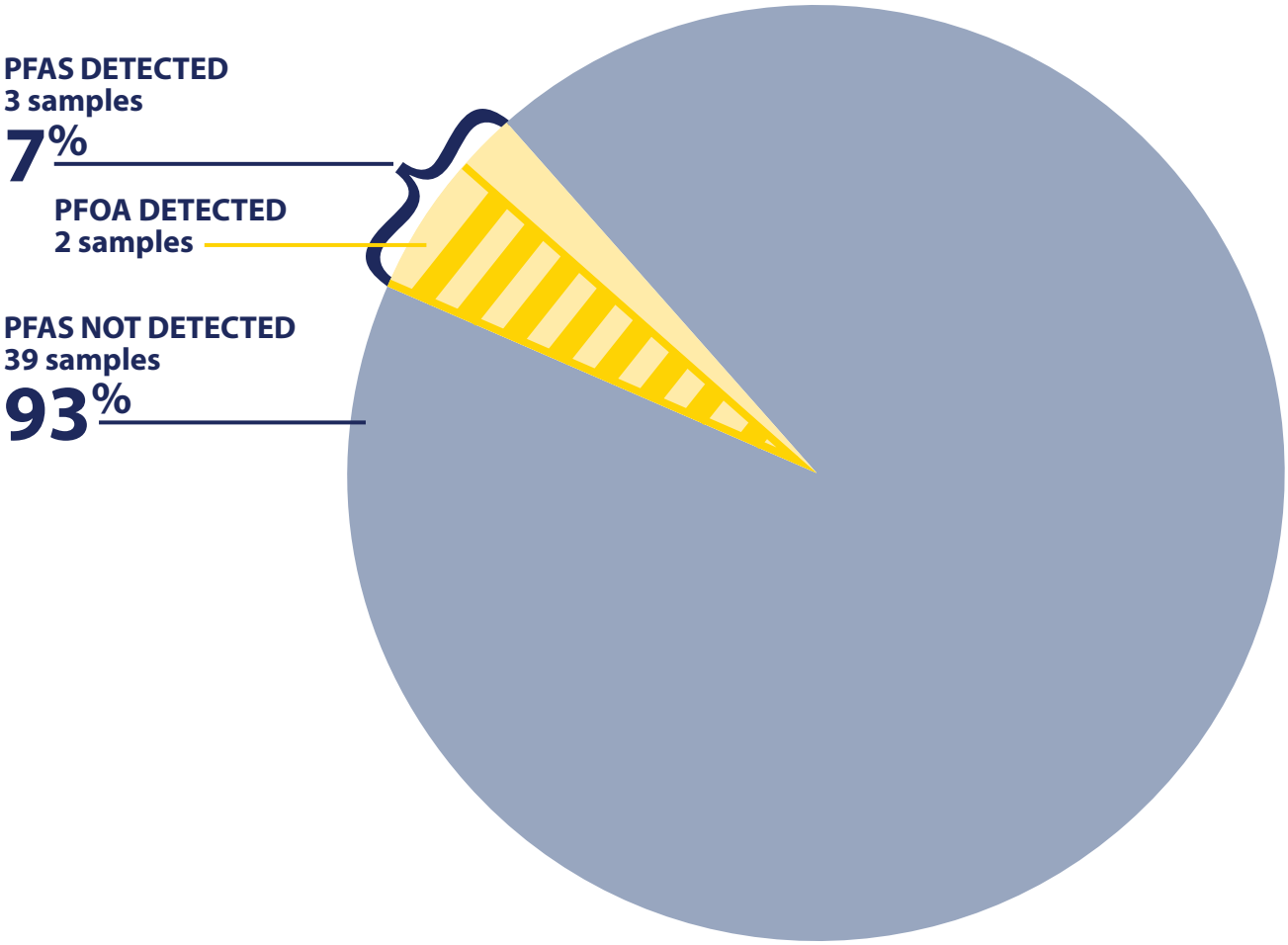
- Samples were analyzed for 14 PFAS compounds in accordance with the EPA's analytical method and Navy guidance.
- The EPA has established a drinking water lifetime health advisory of 70 ppt for two PFAS compounds, PFOS and PFOA.
  - There were no detections of PFOS.
  - There were no detections of PFOA above the lifetime health advisory.

Combined PFAS (14 compounds)

42 samples collected



EPA	U.S. Environmental Protection Agency	PFAS	per- and polyfluoroalkyl substances	PFOS	perfluorooctane sulfonate
NRL-CBD	Naval Research Laboratory – Chesapeake Bay Detachment	PFOA	perfluorooctanoic acid	ppt	parts per trillion

What Are PFAS, PFOS, and PFOA?

Additional information can be found online at **www.secnav.navy.mil/eie/pages/pfc-pfas.aspx**

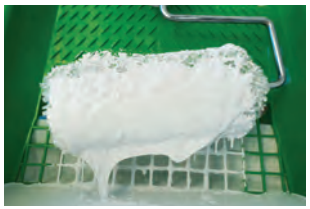
For updates as more information becomes available, visit (case sensitive) **https://go.usa.gov/xQFuw/**

If you have specific questions, please contact **NRLCBDWATER@navy.mil** or **1-855-NRLCBD1 (1-855-675-2231)**

Where Do PFAS Come From?

- Are man-made compounds; no natural occurrence.
- Have been used since 1950s in many products.
- Last a long time in the environment.
- Are found in people, animals, and fish around the world.

firefighting foam



paints and stains

stain-resistant carpets

water-repelling fabrics

nonstick cookware

food packaging

What Is the EPA Lifetime Health Advisory for PFOS and PFOA?

- Sets a concentration of 70 ppt in drinking water.
- Protects against harmful health effects to sensitive populations and the general public, even for lifetime exposure.
- Compares the total concentration of both PFOS and PFOA found to the 70 ppt advisory.
- Provides information to state agencies and public health officials on health effects and water treatment so they can take steps to reduce exposures.
- Is non-enforceable.

How Is the EPA Lifetime Health Advisory Calculated?

- Is based on studies of health effects with PFOS and PFOA in laboratory animals.
- Considers information regarding health effects of people exposed to PFOS and PFOA.
- Protects sensitive populations, including the fetuses or nursing infants of mothers who are exposed.
- Assumes 20 percent of overall exposure is from drinking water, 80 percent of exposure is from other sources.

ATSDR	Agency for Toxic Substances and Disease Registry	PFAS	per- and polyfluoroalkyl substances
CDC	Centers for Disease Control and Prevention	PFOA	perfluorooctanoic acid
EPA	U.S. Environmental Protection Agency	PFOS	perfluorooctane sulfonate
NRL-CBD	Naval Research Laboratory – Chesapeake Bay Detachment	ppt	parts per trillion

Exposure and Health Effects

Additional information can be found online at **www.secnav.navy.mil/eie/pages/pfc-pfas.aspx**

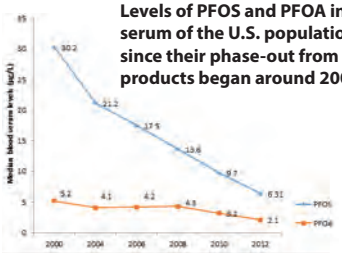
For updates as more information becomes available, visit (case sensitive) **https://go.usa.gov/xQFuw/**

If you have specific questions, please contact **NRLCBDWATER@navy.mil** or **1-855-NRLCBD1 (1-855-675-2231)**

PFAS in People

- CDC monitoring estimates that most people in the U.S. have PFAS in their bodies.
- Levels of PFOS and PFOA are going down over time following their phase-out from use.
- Some PFAS stay in the body a long time – there is no recommended medical treatment to reduce PFAS in the body.

Levels of PFOS and PFOA in blood serum of the U.S. population since their phase-out from products began around 2002



Source: CDC National Health and Nutrition Examination Survey

Exposures to PFAS

- Appear to be widespread around the world.
- Are primarily through:
  - Ingesting contaminated food, water, or soil
  - Breathing air that contains contaminated dust from carpets, upholstery, clothing, etc.
- Will build up in the body until exposure stops.
- Reach the fetuses or nursing infants of mothers who are exposed.
- Are not significant through skin contact when bathing or showering.

How to Reduce Exposure

- If water contains PFOS and PFOA above the health advisory level, you can reduce exposure by using a different water source for drinking, cooking, and brushing teeth.
- Filter PFOS and PFOA from water using certified granular activated carbon or high-pressure membrane systems, such as reverse osmosis. These systems require ongoing maintenance.

Potential Health Effects

- More research is needed to confirm or rule out possible links between exposure and health effects.
- Animals exposed to high levels of PFAS had changes in liver, thyroid, and pancreas function; altered hormone levels; and increased rates of certain cancers.
- Based on limited evidence from studies with people, potential health effects can include:
  - Increased cholesterol levels
  - Changes in growth, learning, and behavior of the developing fetus and child
  - Immune system changes
  - Decreased fertility
  - Altered hormone function
  - Increased risk of certain types of cancer
- The levels of PFOS or PFOA in drinking water do not predict what, if any, health impact might occur as a result of exposure.

Should I Have My Blood Tested?

ATSDR and CDC understand and acknowledge that you may want to know the level of PFAS in your body. However, there are some limitations with blood tests to consider:

- Test results will not provide clear answers for existing or possible health effects or patient care.
- Blood testing for PFAS is not a routine test that health care providers offer.

Consult with your doctor for more information.

ATSDR	Agency for Toxic Substances and Disease Registry
CDC	Centers for Disease Control and Prevention
EPA	U.S. Environmental Protection Agency
NRL-CBD	Naval Research Laboratory – Chesapeake Bay Detachment
PFAS	per- and polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
ppt	parts per trillion

Community Involvement

Additional information can be found online at **www.secnav.navy.mil/eie/pages/pfc-pfas.aspx**

For more information on NRL-CBD environmental activities, visit (case sensitive) **https://go.usa.gov/xQFuV**

If you have specific questions, please contact **NRLCBDWATER@navy.mil** or **1-855-NRLCBD1 (1-855-675-2231)**

Current Outreach Efforts

- **Host Public Meetings –** Public meeting held in July 2018 to provide plans for off-base drinking water sampling.
- **Maintain Information Repositories –** Copies of environmental cleanup program documents are available:
  - On the **NRL-CBD website:** https://go.usa.gov/xQFuV
  - During the public comment period for a proposed plan at **Calvert Library Twin Beaches Branch**
    3819 Harbor Road
    Chesapeake Beach, MD 20732

We Need Your Feedback!

Please complete a survey form and let us know if you are interested in joining a RAB or how you would most like to receive information about the environmental cleanup program sites.

Option for Increased Community Involvement

Restoration Advisory Board (RAB)

- The Navy will form a RAB when there is sufficient and sustained community interest.
- A RAB is a group of interested local community members who meet with Navy personnel on a routine basis to discuss and provide feedback and advice on environmental cleanup plans and actions.
- To establish a RAB, the Navy needs:
  - At least 10 community members committed to fulfilling RAB responsibilities for a 2-year period.
  - A variety of people representing diverse interests from the local community.

What are RAB Member Responsibilities?

- Provide community input to the Navy, regulators, and other government agencies on environmental clean-up activities.
- Review and comment on various technical documents and related site information.
- Attend routine RAB meetings and discuss and exchange information regarding site cleanup.
- Serve as a liaison with the community and provide them with information discussed at the RAB meetings.

NRL-CBD Naval Research Laboratory – Chesapeake Bay Detachment RAB Restoration Advisory Board

Federal Environmental Investigation Process

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

For more information on NRL-CBD environmental activities, visit (case sensitive) **https://go.usa.gov/xQFuV**

For more information on EPA processes, visit **https://www.epa.gov/superfund**

For more information on Maryland processes, visit **www.mde.maryland.gov**

Implementation Process

Activity boxes do not indicate the relative length of any activity.

INVESTIGATION

The on-base PFAS investigation is in the early stages. A preliminary groundwater investigation was conducted and verified that PFAS were released into the environment at Site 10. The goal of the Site Inspection is to determine the magnitude and extent of that release (both on-base and off-base as necessary).

- **Preliminary Assessment**
- **Site Inspection**
  - Site 3 – Landfill No. 1
  - Site 4 – Landfill No. 2
  - Site 5 – Landfill No. 3
  - Site 7 – Road Oil Application
  - Site 9 – Photo-Processing Waste
  - Site 10 – Fire Testing Area
  - AOC D – Water Tower
- **Remedial Investigation**
- **Feasibility Study**
- **Proposed Plan/ Decision Document**
  - MRS 001 – Hypervelocity Low Pressure Gun
  - MRS 002 – Zuni Launch Site
  - MRS 002 – Gun Mounts

CLEANUP

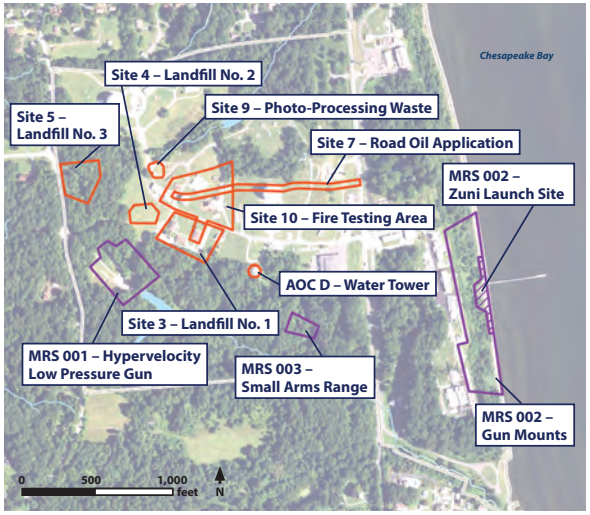
- **Remedial Design**
- **Remedial Action Construction**
  - MRS 003 – Small Arms Range
- **Remedial Action Operation**

LONG-TERM MANAGEMENT

- **Long-Term Management**

NRL-CBD Environmental Restoration Program

- The Environmental Restoration Program investigates environmental releases from past Navy operations.
  - The Installation Restoration Program was designed to identify and clean up past contamination from chemical and radiological contaminants, hazardous substances, and pollutants to protect human health and safety and the environment at Navy and Marine Corps installations.
  - The Munitions Response Program was designed to address the explosives safety hazards associated with munitions of an explosive concern, as well as the human health and environmental risks associated with munitions constituents.



EPA U.S. Environmental Protection Agency
MDE Maryland Department of the Environment
NRL-CBD Naval Research Laboratory – Chesapeake Bay Detachment
PFAS per- and polyfluoroalkyl substances

NRL-CBD Environmental Restoration Program – Installation Restoration Sites

Additional information can be found online at (case sensitive)
https://go.usa.gov/xQFuV/

LEGEND

Installation Restoration Site or AOC boundary

NRL-CBD boundary

0 500 1,000 feet N

AOC	Area of Concern
NRL-CBD	Naval Research Laboratory – Chesapeake Bay Detachment
PCB	polychlorinated biphenyl
SVOC	semivolatile organic compound
VOC	volatile organic compound

Installation Restoration Sites

Site 3 – Landfill No. 1

- Base municipal landfill from 1942 to 1950
- Site Inspection – Soil and groundwater sampled for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, polychlorinated biphenyls (PCBs), and pesticides

Site 4 – Landfill No. 2

- Base municipal landfill from 1950 to 1958
- Site Inspection – Soil and groundwater sampled for VOCs, SVOCs, metals, PCBs, and pesticides

Site 5 – Landfill No. 3

- Base municipal landfill from 1958 to 1968
- Site Inspection – Soil and groundwater sampled for VOCs, SVOCs, metals, PCBs, and pesticides

Site 7 – Road Oil Application

- Historical dirt roads reportedly sprayed with waste oils as dust control between 1940 and 1952
- Site Inspection – Soil sampled for VOCs, metals, and PCBs

Site 9 – Photo-Processing Waste

- Discharge from photo-processing lab located inside Former Building 43 released to the ground during the 1950s and 1960s
- Site Inspection – Soil and groundwater sampled for VOCs, SVOCs, and metals

Site 10 – Fire Testing Area

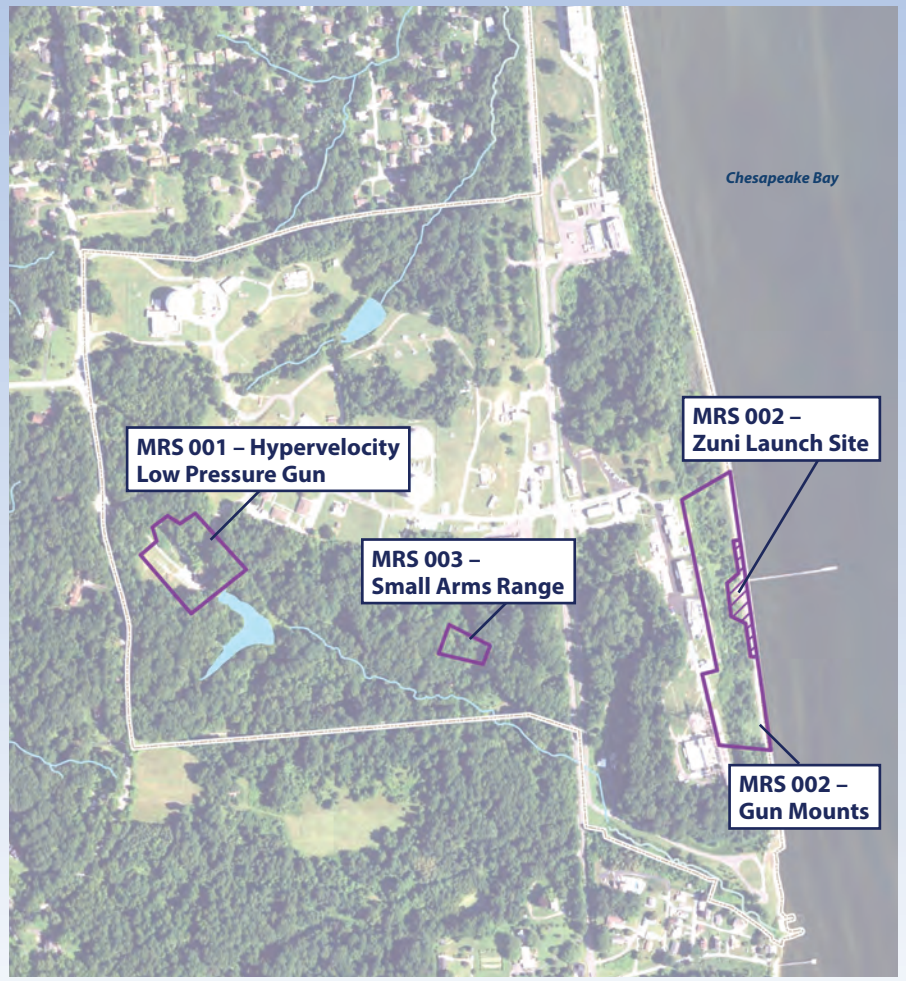
- Site in use since approximately 1968 to test fire extinguishing agents
- Site Inspection – Results of ongoing on-base PFAS investigation will be used to determine if additional off-base sampling is needed

AOC D – Water Tower

- Base water tower in use since 1950s; soils beneath water tower impacted by lead from lead-based paint used on the water tower
- Site Inspection – Soil sampled for lead

NRL-CBD Environmental Restoration Program – Munitions Response Sites

Additional information can be found online at (case sensitive)
https://go.usa.gov/xQFuV/



LEGEND

MRS boundary NRL-CBD boundary 0 500 1,000 feet N

MRS Munitions Response Site
NRL-CBD Naval Research Laboratory – Chesapeake Bay Detachment

Munitions Response Sites

MRS 001 – Hypervelocity Low Pressure Gun

- Test facility used between 1967 and 1995
- Proposed Plan – Navy currently developing proposed plan for soil and groundwater at this site

MRS 002 – Randle Cliffs: Zuni Launch Site and Gun Mounts

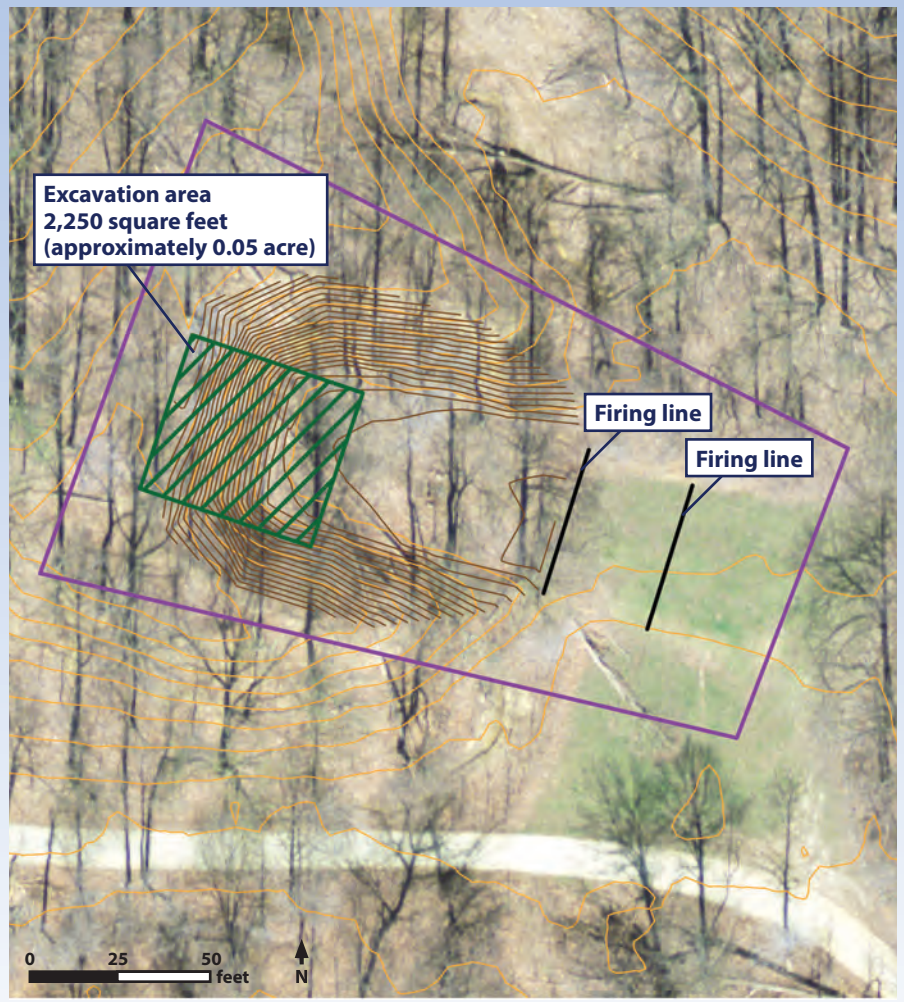
- Zuni Launch Site – Used between 1960s and 1992; site activities limited to production lot quality control testing and research associated with chaff rounds
- Gun Mounts – Used for a short period from 1944 to 1948; site activities likely involved gun sighting
- Proposed Plan – Navy proposing No Further Action as no contaminants of concern were identified in soil

MRS 003 – Small Arms Range

- Small arms range used from 1960s until early 1990s for recreation and small arms qualification
- Remedial Action – Navy currently developing remedial action workplan to excavate lead-contaminated surface soil and dispose of it in off-site landfill

Planned Soil Remedial Action
MRS 003 – Small Arms Range

Additional information can be found online at (case sensitive)
https://go.usa.gov/xQFuV/



LEGEND

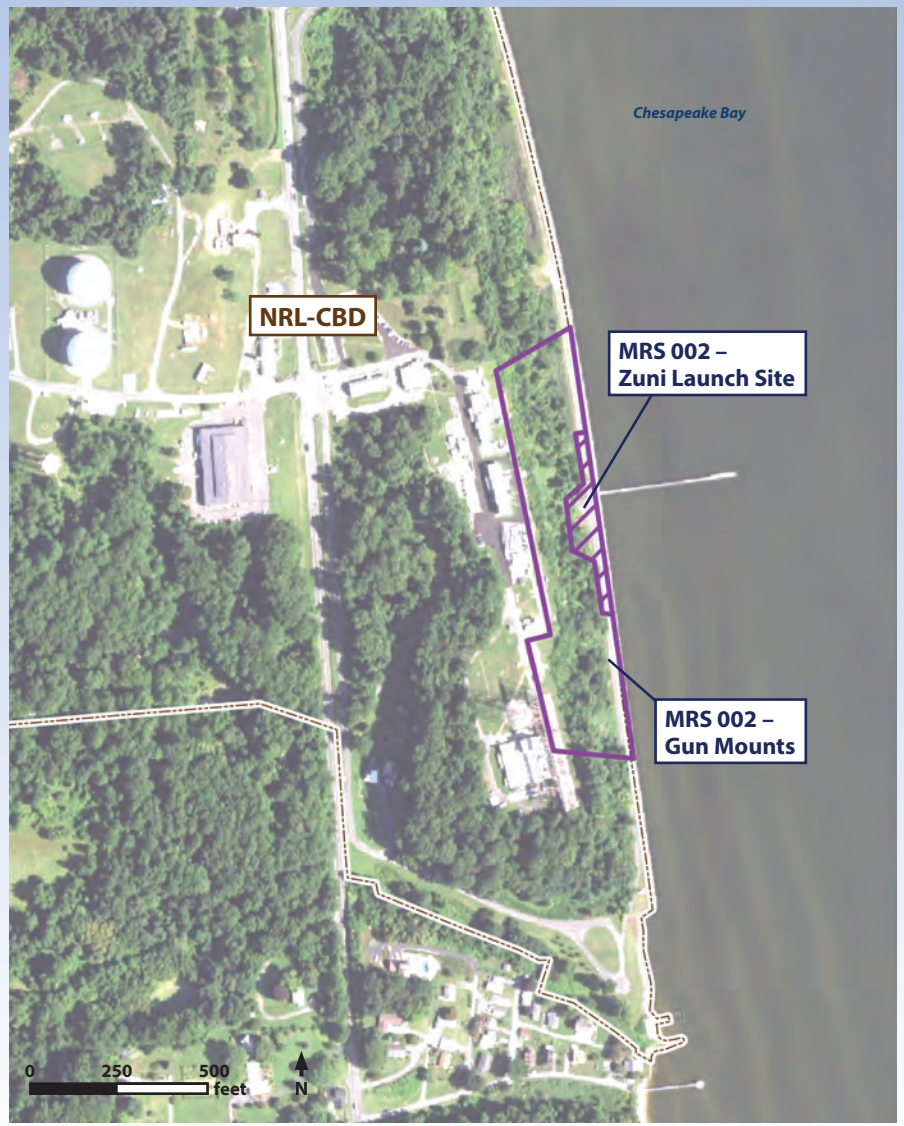
- MRS 003 Small Arms Range
- Excavation area
- Topographic contour (1-foot interval)
- Topographic contour (1-meter interval)

- Munitions Response Site 003 (MRS 003) was first used in the 1960s for recreational purposes. Navy personnel and contract guard forces also used the range for small arms qualification. The range was closed early in the 1990s.
- The site was evaluated in the 2010 Site Inspection and 2016 Remedial Investigation. Lead in surface soil was identified as a chemical of concern.
- The Navy plans to implement Excavation and Off-Site Disposal to prevent unacceptable risks to human health and the environment from exposure to lead in surface soil.
  - Under this action, approximately 50 cubic yards of lead-contaminated surface soil within an area of 0.05 acre will be excavated and transported off-site for disposal.
  - The proposed timeframe for this action is February–March 2019.
- The groundwater remedy for the site is being addressed separately from the soil. Groundwater at the site was investigated during the Remedial Investigation for metals contamination. Currently, the Navy is evaluating remedial alternatives through a Feasibility Study.

Proposed Plan
Soil at MRS 002 – Randle Cliffs: Zuni Launch Site and Gun Mounts

Additional information can be found online at (case sensitive)
https://go.usa.gov/xQFuV/

If you have specific questions, please contact NAVFAC Washington PAO
Ms. Regina Adams at **regina.adams@navy.mil** or **202-685-0384**



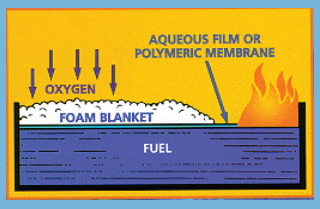
- Between the 1960s and 1992, the Zuni Launch Site was used in quality control testing and research associated with chaff rounds.
- From 1944 to 1948, Gun Mount activities involved gun sighting experiments.
- The areas were investigated during the 2010 Site Inspection and 2016 Remedial Investigation.
- In soil, no chemicals were identified as potential risks to human health or the environment. Therefore, the Navy, with the support of the Maryland Department of the Environment, proposes No Further Action for soil at MRS 002.
  - The public comment period for the Proposed Plan is October 24 to November 23, 2018.
- The groundwater remedy for the site is being addressed separately from the soil. Groundwater at the site was investigated during the Remedial Investigation. Currently, the Navy is evaluating remedial alternatives through a Feasibility Study.

U.S. NAVAL RESEARCH LABORATORY

CHESAPEAKE BAY DETACHMENT

NRL-CBD Fire and Combustion Research

AFFF REFORMULATION AND REPLACEMENT TESTING



AFFF Fire Suppression Process

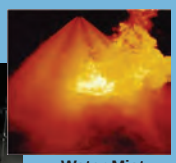
28 ft² MILSPEC Test

FIRE TESTING AREA

- indoor/outdoor testing areas
- concrete lined since the late 1980s
- all above-ground transfer process

FIRE SUPPRESSION ANALYSIS AND DOCTRINE DEVELOPMENT

HiEx Foam Suppression Analysis



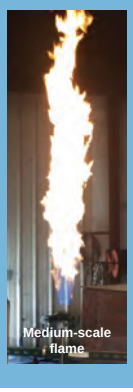
Water Mist Suppression Analysis

Self-Contained Aerosol Generators Testing

LITHIUM BATTERY CASUALTY MITIGATION

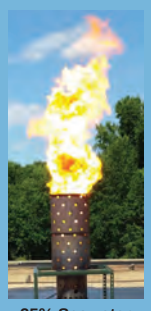
CARINA and MK18 Mod 2 UUV Testing

OIL SPILL REMEDIATION SCIENCE AND TECHNOLOGY



CFD Validation for In Situ Wellhead Burning Efficiency

In Situ Burn Ignition



25% Seawater Burn Test

PROPULSION COMBUSTION SCIENCE RESEARCH

Gas Turbine Combustion

Multi-pass Raman Scattering Experiment