Naval Surface Warfare Center Dahlgren Division (NSWCDD) Land Range Assessment (LRA) Factsheet

NAVSEA WARFARE CENTERS DAHLGREN

September 2021

Background

The U.S. Navy's Range Sustainment Program is designed to ensure that training and testing ranges remain operational while protecting human health and the environment in nearby communities. The Range Sustainability Environmental Program Assessment (RSEPA) process is a Navy initiative designed to assess potential environmental impacts of military readiness activities and to implement measures to protect the environment when needed.

The first step of the RSEPA process is the Range Condition Assessment, or RCA, which is an information gathering process that fundamentally answers two questions:

1) Is the range in full compliance with the environmental laws and policies?

2) Is there a threat of an off-range release of munitions constituents of concern (MCC)?

MCC are defined as materials originating from munitions, including explosive, non-explosive, emissions, degradation or breakdown elements.

This fact sheet summarizes and explains the findings and conclusions of the latest assessment.

NSWCDD LRA Findings

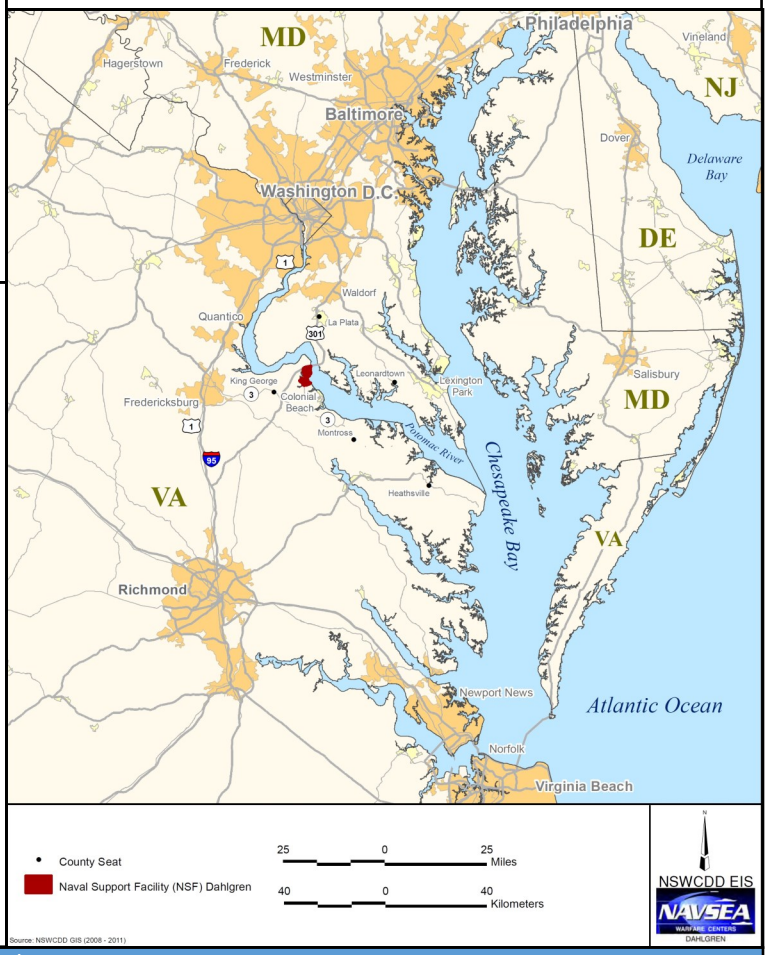
- ✓ NSWCDD Land Ranges meet environmental compliance requirements
- ✓ Munitions constituents of concern have not migrated off-range and there is not potential for off-range releases expected
- ✓ No environmental issues were identified that would adversely impact human health

NSWCDD Land Ranges

The NSWCDD land-based ranges are located within the Naval Support Facility Dahlgren in Virginia (Figure 1). The six NSWCDD land-based ranges encompass several distinct areas, on the main side of the facility, and at the Explosives Experimental Area (EEA) (Figure 2) across Upper Machodoc Creek. The mainside ranges encompass approximately 725 acres and the EEA is a 1641 acre site.

Since its beginnings in 1918 as the U.S. Naval Proving Ground, NSWCDD has been doing proof testing, lot acceptance, safety testing, RDT&E for small and large caliber guns, and other types of military munitions. NSWCDD now provides RDT&E, analysis, systems engineering, integration and certification of complex naval warfare systems related to surface warfare, strategic systems, combat and weapons systems associated with surface warfare across six land-based ranges. Activities at the ranges are complex and varied.

Figure 1 NSWCDD Location Map



RSEPA Efforts

NSWCDD evaluated the range use history, the types and quantities of munitions used and their associated chemical constituents, spatial distribution of activities, available environmental data, environmental regulatory requirements, and environmental compliance efforts to ensure site model inputs remained the same as in the 2010 RCA and 2016 update, and the ranges were in compliance with all laws and regulations. Information for the current five-year update was derived from site visits, personnel interviews, archive searches, and document reviews conducted throughout the summer of 2021.

Potential for Off-Range Releases of MCCs

The Environmental Impact Statement, "Outdoor Research, Development, Test and Evaluation Activities," (2013) and the Permit for the Thermal Treatment of Hazardous Waste by Open Burning and Open Detonation (2021) (OB/OD Permit) both included modeling efforts to determine potential exposure pathways of MCCs for human health and ecological risk. A five-year review of these program areas indicates there is no potential for off-range release at concentrations which exceed the United States Environmental Protection Agency Human Health and Ecological screening levels.

Perchlorate and RDX continue to be detected in levels above Groundwater Protection Standards at EEA in the aquifer, approximately 2 to 20 feet below land surface. The contamination is being closely monitored by NSWCDD as required by the OB/OD Permit. Based on the current groundwater flow model (2015), the trends of steady or attenuating contaminant concentrations in both the soil and groundwater, and the lack of plume migration show that monitored natural attenuation is effective in mitigating any increases in the extent or concentration of the contamination in the groundwater underlying the EEA.

Therefore, further analysis to assess risk of potential off-range release is not warranted at this time.

Environmental Compliance Review

During this five-year review, no compliance issues were identified and no environmental concerns were discovered. The results confirmed that the Range meets environmental compliance requirements.

What's Next?

In accordance with the Navy's RSEPA policy, the RSEPA process is complete and no further action is required at this time. Another RCA update of the operational ranges will commence in five years as required by the policy.

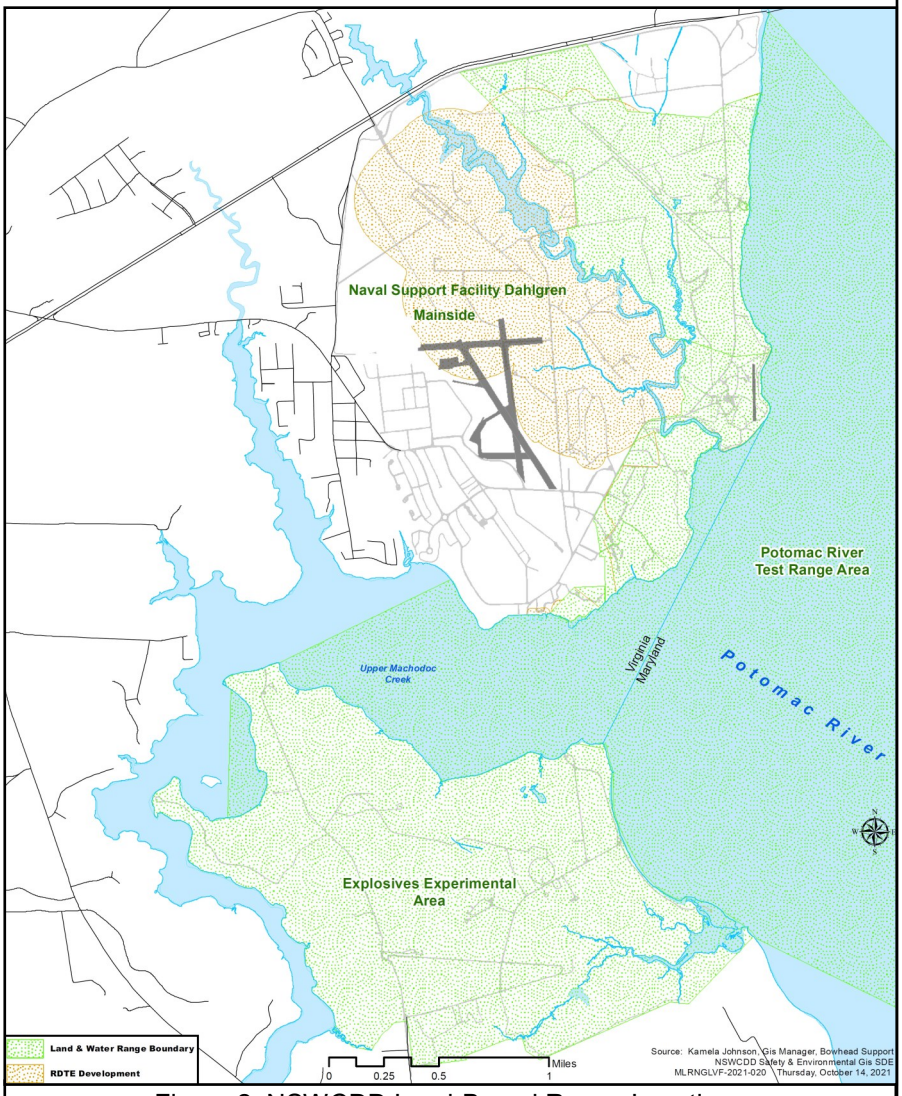


Figure 2: NSWCDD Land-Based Range Locations

For more information contact NSWCDD Public Affairs Office at 540-653-8152

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RANGE CONDITION ASSESSMENT FIVE-YEAR REVIEW

DAHLGREN

Environmental Branch
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By direction

RANGE CONDITION ASSESSMENT FIVE-YEAR UPDATE TECHNICAL MEMORANDUM

Subj: Five-Year Land-Based Range Assessment at Naval Surface Warfare Center Dahlgren Division

Ref: (a) NAVSEA (Naval Sea Systems Command). Range Condition Assessment Report, Naval Surface Warfare Center – Dahlgren Laboratory (NSWCDL) Ranges, Dahlgren, Virginia, dated September 2010.

(b) NAVSEA (Naval Sea Systems Command). Range Condition Assessment Five Year Review, Naval Surface Warfare Center Dahlgren Land Ranges, Dahlgren, Virginia, dated June 2016.

(c) AECOM. Final Environmental Impact Statement, Outdoor Research, Development, Test & Evaluation Activities at Naval Surface Warfare Center Dahlgren, dated June 2013.

(d) Virginia Department of Environmental Quality. Permit for the Thermal Treatment of Hazardous Waste by Open Burning and Open Detonation, Permit No. VA7170024684, dated 28 April 2021.

(e) Department of Defense Instruction Number 4715.14, Operational Range Assessments. Under Secretary of Defense for Acquisition, Technology, and Logistics, dated 30 November 2005.

(f) OPNAV M-5090.1 Environmental Readiness Program Manual, Chapter 15, Navy Operational Range Environmental Sustainment, dated 25 June 2021.

(g) Range Sustainability Environmental Program Assessment (RSEPA) Program Assessment Manual, dated 17 January 2018.

1. **Executive Summary:** This technical memorandum summarizes the assessment and conclusions of the latest Range Sustainability Environmental Program Assessment (RSEPA) Range Condition Assessment (RCA) for the land based ranges at Naval Surface Warfare Center, Dahlgren Division (NSWCDD). Compliance interviews with range personnel and Naval Support Activity South Potomac (NSASP) environmental personnel were conducted throughout the summer of 2021. The land-based ranges addressed in this assessment are operational testing ranges where research, development, testing, and evaluation (RDT&E) of military munitions and explosives and weapons systems occurs.

   The purpose of the RSEPA process is to assess and address the environmental condition of land-based operational ranges where munitions are used or were used. The initial RCA (reference (a)), for NSWCDD was completed in September 2010, and a subsequent 5-year review completed in June 2016 (reference (b)). Those assessments found that overall, RDT&E operations at NSWCDD-operated ranges were in compliance with applicable environmental program requirements, and there was no need to investigate any areas for

potential off-range releases of Munition Constituents (MCs) beyond investigations already being conducted. The data for this RCA five-year review indicates that NSWCDD-operated land-based ranges are in compliance with appropriate management statutes and regulations. Information regarding compliance for NSWCDD-operated land-based ranges is listed in Section 6. Furthermore, no new regulations were identified that would compromise compliance. Therefore, protective measures already in place and listed in Section 8 will continue, but no additional steps are recommended to maintain compliance at any NSWCDD-operated land-based range.

The Environmental Impact Statement (EIS), "*Outdoor Research, Development, Test and Evaluation Activities,*" reference (c), finalized in 2013, evaluated the impact of past, present, and future RDT&E operations on the environment at NSWCDD, including the land based portion of the Potomac River Test Range (PRTR). An appropriate list of ordnance-related Munition Constituents of Potential Concern (MCOPC) was selected for evaluation in the EIS, based on total mass (cumulative over the last 90 years), toxicity and U.S. Navy guidance, including RSEPA guidance. Additionally, potential exposure pathways were modeled for human health and ecological risk in 2020 during the Resource Conservation and Recovery Act (RCRA) Subpart X permit renewal (reference (d)) and compared to risk-based regional screening levels developed by the U.S. Environmental Protection Agency (USEPA). Furthermore, Installation Restoration (IR) Program requires continual monitoring for MCs. Review of these program areas indicates there is no potential for off-range release at concentrations which exceed the USEPA Human Health and Ecological screening levels. Therefore, further analysis to assess risk of potential off-range release is not warranted at this time.

2. **Introduction:** The Navy meets the requirements of references (e) and (f), conducting operational range assessments, by implementing the RSEPA program as described in reference (g). The Navy developed RSEPA to aid in analyzing and addressing environmental concerns by implementing a systematic assessment program that is designed to sustain operational readiness while assessing the potential risks to human health and the environment. RSEPA is conducted to ensure: (1) range operations comply with existing environmental laws and regulations; and (2) MCOPCs associated with RDT&E and training activities do not migrate off range and present an unacceptable risk to human health or the environment.

   RSEPA assessments are conducted every five years or sooner when significant changes (e.g., changes in range operations, site conditions, applicable statues, regulations, Department of Defense issuances, or other policies) occur that may affect determinations made during the previous assessment.

   The RCA five-year review was initiated in the summer of 2021. The review included site visits and interviews with NSWCDD and NSASP personnel to support revisions to the environmental compliance assessment areas, where applicable. The review looked at the same six NSWCDD land-based ranges as in

the original RCA (reference (a)) where munitions operations are conducted: Anti-Aircraft (AA) Fuze Range, Explosives Experimental Area (EEA), Machine Gun Range, Main Range, Missile Test Range, and Terminal Range. This review does not address the PRTR, since water ranges are addressed by a separate Water RSEPA process.

3. **Purpose and Objectives:** The first phase of the RSEPA process is the RCA. The RCA is conducted to determine if further steps are necessary to maintain compliance and whether further analysis is required to assess risks related to a potential off-range release of MCOPCs. If further analysis is required or if a specific concern remains, a comprehensive range evaluation will be conducted to assess the matter in greater detail and determine the actions required to ensure range sustainability. Additionally, at any point in the RSEPA process, protective measures can be implemented to address a potential concern. Protective measures are actions or best management practices implemented on-range to sustain range operations; maintain environmental compliance; and prevent, minimize, stabilize, eliminate, or abate a release or threat of release of MCOPCs to off-range areas.

   Per reference (g)—the Navy RSEPA Manual, the methodology of this assessment focused on identifying changes (e.g., changes to range operations, new regulations or site conditions) that may have occurred since the last RCA update, and determining if these changes have the potential to affect regulatory compliance or range sustainability.

   To achieve these objectives the following actions were conducted:

   - Review of past assessments.
   - Review of range management procedures.
   - Review of current training operations.
   - Evaluation of munitions utilized.
   - Interviews with key environmental and range personnel.
   - Evaluation of compliance with environmental laws and regulations.
   - Review of recent National Environmental Policy Act documentation.
   - Review of the Integrated Cultural Resources Management Plan.
   - Review of the Integrated Natural Resources Management Plan.
   - Site visit to the range.
   - Analysis of potential MCOPC pathways.
   - Review of range sustainability recommendations.

   This assessment also evaluated the effectiveness of any protective measures implemented. This sustainability review addressed four general questions pertaining to protective measures:

   - Are they functioning as intended?
   - Are the assumptions used at the time of selection still valid?
   - Is there new information or technology that may influence the selection of the protective measure?

- Are operational accommodations still needed?

4. **SUMMARY OF RANGE USE:** NSWCDD provides RDT&E, analysis, systems engineering, integration and certification of complex naval warfare systems related to surface warfare, strategic systems, combat and weapons systems associated with surface warfare.

   The RDT&E activities that take place on the ranges and associated weapons systems are described below:

   - **Missile Test Range**- This range is used to conduct overland test and evaluation of vehicles and conventional and special weapon components against targets. The range includes suspended targets, fixed and portable facilities and analytical equipment. Experimental devices can be fired into the PRTR from this range. Two electromagnetic launch facilities for railgun and hypervelocity projectile RDT&E are located on this range. Railgun projectiles can be fired into butts, backstops, or into the PRTR. This range also encompasses an Explosive Ordnance Disposal training range for non-fragmenting energetic training operations.
   - **Terminal Range**- This range supports RDT&E and production testing of weapon systems, components, and other ordnance material (specifically, experimental items). This range allows for tests requiring large quantities of explosives, ballistic evaluation of armor plates, penetration tests of projectiles, and high chamber pressures. A projectile recovery system is available to recover projectiles to study gun firing effects, especially for emerging-technology projectiles. Although most firings are aimed into butts or backstops, rounds can be fired into the PRTR. In addition, an Unmanned Aerial Vehicle (UAV) runway allows for testing of UAVs utilizing a variety of RDT&E scenarios including laser tracking.
   - **Main Range**- This range is used for systems integration and testing with networked connectivity to most shipboard combat system elements. The Main Range includes thirty-nine gun emplacements plus test stands for proof-firing gun-mount oscillating assemblies and gun barrels located approximately 1,500 feet from the Potomac River. This range uses the PRTR for fuze and ballistic testing and as an over-the-water backstop for laser weapons. All acceptance testing of gun barrels and mounts are conducted at this range. The Search and Track Sensor Test Site houses radar systems used for gun fire control, systems integration, scanning the range, and controlling unmanned aerial vehicles.
   - **AA Fuze Range**- This range is used for over-the-water testing of lasers, fuzes, proof tests, barrel wear and heating tests, projectile ramming tests, new projectile design evaluation, and water-surface burst data at short and long firing distances. This range offers a large “safety zone” for fuze testing, since it is situated in close proximity to the Potomac River shoreline. The range includes temperature-conditioning equipment and propellant charge weighing and assembly equipment.

- **Machine Gun Range**- This range includes four indoor firing bays, and an outdoor test area with multiple gun emplacements. It also includes two indoor/outdoor bays that use the river range for penetration tests of light-armor materials. Testing of 40-millimeter and smaller guns and ammunition is performed at this range. This range has temperature conditioning chambers and a charge assembly room. The range is also used to evaluate the effectiveness of windshields and protective armor against representative small arms threats, such as improvised explosive devices and other non-conventional threats. The range is equipped to record data such as firing stresses and strains, shock waves, projectile pressure, temperature, position, velocity, and acceleration. The Navy Directed Energy Center conducts indoor and outdoor laser and laser weapon testing on this range. Lasers are directed to targets on the ground within the range, on the PRTR, or to targets across Upper Machodoc Creek at the EEA.
- **EEA**- This range supports performance, lethality, safety, and insensitive-munitions testing on full-scale weapon systems and components containing explosives, propellants, and inert materials. Although the EEA mainly supports RDT&E and safety testing for ordnance weapon systems, such as rocket-propelled grenades, rockets, and restrained missiles, this complex also supports RDT&E of lasers, electromagnetic (EM) energy, and chemical and biological simulants. The EEA is extensively instrumented for conducting explosive tests such as blast measurements, target vulnerability, arena testing, and live-fire tests. Safety testing of ordnance (munitions) includes temperature and humidity cycling, shock, vibration, and a 40-foot drop. Insensitive-munitions tests include fast cook-off, slow cook-off, fragment impact, shaped charge/jet impact, sympathetic detonation, and bullet-impact testing. The Counter Explosive Test Facility, the Naval Ordnance Transient Electromagnetic Simulator Facility, and two ranges – Churchill and Harris – are located within the EEA. The Open Burn and Open Detonation (OB/OD) permitted treatment areas are located on Churchill range.

There have been no changes in operational procedures or any use of new or different live fire weapon munition constituents since the 2010 RCA to impact environmental compliance status.

5. **OPERATIONAL RANGE SITE MODEL (ORSM) ELEMENTS:** The five land-based ranges on main side are considered one ORSM. Churchill and Harris Ranges and the OB/OD units at the EEA are another ORSM.

   Since 2010, these ORSMs developed summarized operational, environmental, and land use conditions that continue to be used to support conclusions and recommendations concerning the potential for off-range migration of MCOPCs. MCOPCs are defined in the RSEPA Policy Implementation Manual as materials originating from military munitions, including explosive and nonexplosive materials, and the emissions, degradation, or breakdown products of such munitions, potentially including, but not limited to, the following:

- 2-Amino-4,6-dinitrotoluene (2-A-4,6-DNT)
- 4-Amino-2,6-dinitrotoluene (4-A-2,6-DNT)
- 1,3-Dinitrobenzene (1,3-DNB)
- 2,4-Dinitrotoluene (2,4-DNT)
- 2,6-Dinitrotoluene (2,6-DNT)
- Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)
- Methyl-2,4,6-trinitrophenylnitramine (Tetryl)
- Nitrobenzene
- Nitroglycerin
- 2-Nitrotoluene
- 3-Nitrotoluene
- 4-Nitrotoluene
- Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)
- Perchlorate
- 1,3,5-Trinitrobenzene (1,3,5-TNB)
- 2,4,6-Trinitrotoluene (TNT), and
- Metals (e.g., aluminum, arsenic, lead, and mercury).

The inputs to the 2010 ORSMs for both the main side and EEA ranges are still applicable. Current range operations, described in Section 4 apply. Future work includes anticipated increases in laser operations, EM testing, projectile testing, and radio frequency operations. These RDT&E areas were fully explored in the EIS and are also continually monitored by the IR Program and the RCRA Subpart X permitting requirements.

Inputs to the environmental and land use elements have not changed since 2010.

6. **ENVIRONMENTAL COMPLIANCE ASSESSMENT:** The Navy has an effective environmental compliance program in place to support the NSWCDD land-based ranges. No significant changes have occurred that would adversely affect their regulatory compliance status. Additionally, there have been no new regulations or Navy polices enacted that could affect the land-based range regulatory compliance posture.

   The following environmental resource areas were reviewed during performance of this assessment:

   - Air Quality,
   - Water Quality,
   - Military Munitions/Solid Waste/Hazardous Materials/Hazardous Waste,
   - Cultural Resources,
   - Natural Resources,
   - Emergency Planning and Community Right-to-Know Act Compliance,
   - Environmental Planning,
   - Range Environmental and Explosive Safety Management,
   - IR Program,
   - Storage Tank and Petroleum, Oil, and Lubricant Management, and

- Drinking Water.

During investigations, no environmental compliance issues were identified and no environmental concerns were discovered. Day-to-day environmental compliance is assured by the NSWCDD Environmental Branch, range supervisors, and range personnel. NSWCDD has a well established Operations Safety Committee (OSC) process for proposed test activities on the ranges. Compliance areas are an integral part of the OSC process via the committee. All test plans are required to comply with all pertinent requirements before they are signed off and test engineers are allowed to proceed. Additionally, personnel from NSWCDD environmental provide regulatory guidance, oversight, and routine environmental compliance inspections. If issues are discovered, they are quickly resolved. No systematic or chronic compliance issues have been identified.

7. **OFF-RANGE MIGRATION ASSESSMENT:** A primary goal of RSEPA is to determine if there is a release or the potential for an off-range release of MCs that may pose an unacceptable risk to human health or the environment, and if so, implement measures to address the issue to ensure the Navy maintains the long-term use of its testing ranges to sustain operational readiness. The RSEPA process provides a systematic, consistent, and technically defensible approach to range assessments. The first phase of the process is the RCA, and its objective is to determine if further analysis is required to assess the risk of an off-range release of MCs. If additional actions are required, they will be conducted in subsequent steps of the RSEPA process; if further analysis is not required, the assessment concludes at this point (and is repeated in five years). As this effort is the first phase of the RSEPA process, the focus is on answering the question—Is further analysis required to assess the risk of an off-range release of MCs? In addressing this question, the analysis will focus on the source-pathway-receptor connection at each range. If there is a break in this chain (e.g., there is no significant source of MCs, or there is no pathway for MCs to reach receptors, or the presence of/interaction with receptors are unlikely), then no further analysis will be required.

   Reference (c), finalized in 2013, evaluated the impact of past, present, and future RDT&E operations on the environment at NSWCDD, including all the land based ranges. An appropriate list of ordnance-related MCOPCs was selected for evaluation in the EIS, based on total mass (cumulative over the last 90 years), toxicity and U.S. Navy guidance, including RSEPA guidance. The MCOPC included seven metals (Cd, Cr, Cu, Pb, Mn, Ni and Zn) and five explosive constituents (ammonium picrate, HMX, RDX, Tetryl and TNT). Potential exposure pathways were modeled for human health and ecological risk when compared to risk-based regional screening levels developed by the USEPA.

   Additionally, the RCRA Subpart X permitting requirements address any areas where there is a potential for any off-range release of MCs, including low levels of explosives (e.g., RDX) and perchlorate in shallow aquifer wells at EEA. The groundwater underlying EEA is monitored to ensure MCOPC are not increasing

in extent or concentration. No munitions constituents have been detected in the drinking water source for main side or EEA. However, perchlorate and RDX continue to be detected in levels above Groundwater Protection Standards (GPSs) at EEA in the surficial aquifer, approximately 2 to 20 feet below land surface. The contamination is being closely monitored by NSWCDD as required by reference (d). Based on the current groundwater flow model, which was updated in 2015, the trends of steady or attenuating contaminant concentrations, and the lack of plume migration, it appears that monitored natural attenuation is effective in mitigating any increases in the extent or concentration of the contamination in the shallow groundwater underlying the OB and OD units at EEA.

To monitor RDX and perchlorate in the surface water at EEA, numerous surface water samples have been collected from multiple locations within Black Marsh, approximately 4200 feet upstream from the Navy property boundary on the Potomac River. The samples occasionally show concentrations of RDX above the facility-specific GPS of 13.4micrograms per liter, although no surface water quality standards exist for Virginia state waters for RDX. The maximum RDX concentration is also below the screening benchmarks that have been published by various USEPA regions. The perchlorate concentrations in the surface water are all below the GPS. RDX and perchlorate levels continue to be closely monitored by NSWCDD and samples to date have shown no increase in either RDX or perchlorate concentration since surface water sampling was initiated in 2011.

Review of these program areas indicates there is no potential for off-range release at concentrations which exceed the USEPA Human Health and Ecological screening levels. Therefore, further analysis to assess risk of potential off-range release is not warranted at this time.

8. **REVIEW OF PROTECTIVE MEASURES:** The following protective measures have been identified in order to maintain compliance with environmental and munitions management requirements and ensure future RDT&E mission success on existing ranges:

   - Storm Water/Wastewater- When munitions from range operations are exposed via erosion or other processes, Operational Range Clearance (ORC) Best Management Practices (BMPs) will be followed to reduce potential risks to human health and the environment. Range personnel will continue to inspect the shoreline at the Old Plate Battery Test Area periodically and after storm events. Any munitions or debris that are exposed at the Old Plate Battery Test Area will be properly managed. NSWCDD will also continue to monitor the progress of NSASP's shoreline stabilization project that is currently in design and permitting stage. Wastewater from the fast cook-off octagon at the EEA is collected as soon as SOPs allow, to prevent the hydrocarbon tainted water from escaping with rainwater/stormwater.
   - Military Munitions/Solid Waste/Hazardous Materials/Hazardous Waste- When munitions from range operations are exposed via erosion or other

processes, ORC BMPs will be followed to reduce potential risks to human health and/or the environment. Range personnel will continue to inspect the shoreline at the Old Plate Battery Test Area periodically and after storm events. Any munitions or debris that are exposed at the Old Plate Battery Test Area will be properly managed.

- Environmental Planning- NSWCDD will continue proactive communication between the military, local jurisdictions, and various stakeholders through operating a toll-free phone line for noise complaints, announcing the range schedule for expected loud gun firings on a public website, participating in NSASP Community Relations meetings and presentations with local communities, and participating in development and implementation of the NSASP, Naval Support Facility Dahlgren Encroachment Action Plan.
- Range Environmental and Explosives Safety Management- When munitions from range operations are exposed via erosion or other processes, ORC BMPs will be followed to reduce potential risks to human health and the environment. Range personnel will continue to sweep the shoreline at the Old Plate Battery Test Area periodically and after storm events. NSWCDD will also continue to monitor the progress of NSASP's shoreline stabilization project that is currently in design and permitting stage. Range clearance of potentially explosive-contaminated components or raw propellants scattered by test operations are routinely collected during post operation for treatment as hazardous waste.
- Safe Drinking Water- NSWCDD will continue to closely monitor RDX and perchlorate in both groundwater and surface waters at EEA and stay up to date on any proposed maximum concentration guidelines. All drinking water wells near the EEA are up-gradient from the EEA.
- Range Encroachment- In addition to the Encroachment Action Plan, NSWCDD engages in proactive communication activities between the military, local jurisdictions, and various stakeholders through the Joint Land Use Study and other outreach programs.

9. **CONCLUSION:** The data reviewed for the RCA five-year review indicate that NSWCDD is in compliance with appropriate management statutes and regulations for the RCA areas of interest. Protective measures initially implemented in the 2010 RCA enhance range sustainment and provide for a more secure operational environment.

   Review of analytical data and the risk assessment model indicates there is no significant potential for off-range releases at NSWCDD at concentrations which exceed screening levels. Further analysis to assess risk of potential off-range release at this time is not warranted.

   No additional actions or testing restrictions are required to maintain compliance or range sustainability.

10. The NSWCDD point of contact for this technical memorandum is Bethany Brown (540) 653-0933, bethany.brown@navy.mil.


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Existing Range Boundary
RANGE BOUNDARIES
Source: Kamela Johnson, Gis Manager, Bowhead Support
NSWCDD Safety & Environmental Gis SDE
MLRNGLVF-2021-019 Wednesday, October 13, 2021

RANGE BOUNDARY
Explosives Experimental Area

Source: Kamela Johnson, Gis Manager, Bowhead Support
NSWCDD Safety & Environmental Gis SDE
MLRNGLVF-2021-017 Tuesday, September 7, 2021