

# **5-YEAR RADON RETESTING RESULTS FOR NAVAL SUPPORT ACTIVITY NAPLES FAMILY HOUSING**

**July 2023**



**Prepared by NSA Naples Public Works Department Environmental Division  
for NSA Naples Housing Department**



## **NSA NAPLES 5-YEAR RADON RETESTING REPORT FOR FAMILY HOUSING, JULY 2023**

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### **REFERENCES**

- a) Naval Support Activity Naples Radon Management Plan, December 2022
- b) Chief of Naval Operations Environmental Readiness Program Manual, OPNAV M-5090.1D, Chapter 25, Section 3.2
- c) Navy Radon Assessment and Mitigation Program Guidebook for Naval Shore Installations (NAVRAMP), September 2017. (Note: The Guidebook was updated in May 9, 2023; subsequent to completion of the project)
- d) Radon Testing Report for Naval Support Activity Naples, September 16, 2016, Prepared By Oak Ridge National Laboratory



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### EXECUTIVE SUMMARY

This report documents the activities, analyses, quality assurance measures, and results for 5-Year radon retesting completed for NSA Naples Family Housing, in May 2023.

#### **Background**

Radon was previously detected in excess of the Navy Action Level of 4 pico-Curies per liter (pCi/L) in 3 housing units (2037-2, 2145-1, and 2151-2) during an assessment completed in 2016 (reference d). Mitigation measures successfully reduced the radon concentrations to less than 4 pCi/L in all 3 of the units. Routine monitoring of all family housing units is required every 5 years, and monitoring at mitigated units is required every 2 to 3 years.

#### **Activities**

Radon detectors were deployed in 291 testable Family housing units on the NSA Naples Support Site, and at two off-base Flag Officer's Quarters in the area. The majority of the detectors (282 units) were deployed between April 7 to 21, 2022. Follow-up visits were required between April 28 to August 10, 2022, to complete the work at Flag Officer's Quarters and at 9 other previously inaccessible units. All radon detectors were retrieved between April 27 and May 5, 2023, and shipped via FedEx to Radonova, Inc, for analysis. Radonova completed the analyses and delivered their report on 30 May 2023.

#### **Quality Assurance**

Radonova, Inc. RadTrak<sup>2</sup> alpha-track radon detectors were used for this project. Co-located field duplicate samples were deployed at all sample locations. Field Blank samples were deployed at nine representative sample locations. Nine Spiked samples were prepared by a NRPP-accredited radon chamber. One co-located set of detectors was deployed within the PWD EV office for control purposes. All samples, duplicates, spikes, and field blanks were delivered together with two trip blanks to the device manufacturer (Radonova, Inc) by USPS priority mail for analysis. All detectors were sent as blind samples, with no sample type or identification information. Two sealed lab blanks were also included with the shipment.

#### **Results**

A total of 293 family housing (FH) units were included in the project, comprising all testable FH units. The sample data set was validated, and meets all NAVRAMP QA requirements for precision and accuracy. All data has been provided to NAVFAC EXWC for archival purposes.

The detected radon concentration was below the NAVRAMP threshold of 4 pCi/L at 281 (96%) of the FH units, with an overall average detection of 1.3 pCi/L. The radon detectors deployed in FH units 2010-2, 2016-2, 2045-2, 2101-2, 2122-1, 2126-2, 2154-2, and 2155-2 were not present on-site at the end of the sample period, and were not retrieved or analyzed.

The radon concentrations detected at FH Units 2150-2, 2302, 823, and 824 exceed the 4 pCi/L NAVRAMP threshold.

The radon detected in three previously mitigated units (2004-2, 2145-1, and 2151-2) remains below the 4 pCi/L NAVRAMP threshold.



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### **Requirements**

- 1) Retest FH Units, 2010-2, 2016-2, 2045-2, 2101-2, 2122-1, 2126-2, 2154-2, and 2155-2; using 90-day long term tests to comply with NAVRAMP. Append results and data to this report and forward data to EXWC.
- 2) Design and implement mitigation measures to reduce radon concentrations below 4 pCi/L at FH Units 2150-2 and 2302 (Villa Ischia), on Support Site, and at off-site Varloc housing locations 823 Villa Marilu, and 824 Villa Colombaia. Verify the effectiveness of mitigation with short-term and long-term testing, and implement a plan to monitor the mitigated units every 2 to 3 years.
- 3) Continue monitoring all mitigated units every 2 to 3 years.
- 4) Retest all testable family units every 5 years.
- 5) Maintain this report as a record, update the RMP with results and recommendations

### **Recommendations**

- 1) Re-verify the operational status and functionality of the mitigation system in FH Unit 2151-2. The radon concentration at this previously mitigated unit is less than 4 pCi/L, but is significantly higher than the concentration in other mitigated units (2004-2 and 2145-1). This could indicate a performance problem.



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### 1 INTRODUCTION

This report is limited to NSA Naples Family Housing (FH), including all testable ground floor FH units on the NSA Naples Support Site and two off-installation Flag Officer's Quarters which are leased to the US Navy.

Privately-rented and privately-owned homes on the economy are not covered under the Navy Radon Assessment and Mitigation Program (NAVRAMP) and are not included in this project.

Unaccompanied Housing (UH) was not tested for this project. NAVRAMP did not previously require retesting or monitoring for non-family housing facilities categorized as NAVRAMP radon potential category (RPC) 3; "low radon potential."; however, changes included in the new NAVRAMP Guidebook (May, 2023) require retesting all testable units in permanent party unaccompanied housing buildings every 5 years. Radon assessment completed in 2016, did not detect radon in excess of the Navy Action Level of 4 pico-Curies per liter (pCi/L) in any UH units.

This report documents the activities, analyses, quality assurance measures, and results for 5-Year radon retesting completed for NSA Naples Family Housing, in May 2023 to maintain compliance with OPNAV INST 5090.1D, and NAVRAMP guidance. For purposes of reporting efficiency, supporting documentation is provided with a minimum of narrative.

### 2 SUMMARY OF NSA NAPLES HOUSING TESTABLE UNITS

PWD EV collaborated with the NSA Naples Housing Department and Commander Navy Region Europe Africa Central, EURAFCENT (CNRE) General & Flag Quarters Program Managers to identify all testable housing units. Testable units included 291 testable Family occupiable ground-floor housing units on the Gricignano Support Site, and 2 off-installation Flag Officer's Quarters. A location plan depicting all on-installation family housing buildings is presented in Appendix A. The two off-installation Flag Officers quarters are not depicted on the map; however, all testable family housing units are listed in the results summary tables provided in Appendix B-1 and B-2.

#### 2.1 Previous Results

Radon was detected in excess of the Navy Action Level of 4 pico-Curies per liter (pCi/L) in three housing units (2037-2, 2145-1, and 2151-2) during the 2016 Assessment,. These units are categorized as NAVRAMP radon potential category (RPC) 1 sites; "elevated radon potential exists". Mitigation measures completed for all (3) housing units successfully reduced the radon concentrations to less than 4 pCi/L, as documented in the RMP.

Two off-site Flag Officer's villas and 3 ground-floor Family Housing units on the Support Site (2027-3, 2051-3, and 2115-2) were not tested in 2016, and were therefore considered to be NAVRAMP radon potential category (RPC) 2 sites; "radon potential is unknown", prior to the current testing.

The remainder of the Family Housing Units tested during the 2016 Assessment did not exceed the Navy Action Level for radon and are categorized as RPC 3; "low radon potential."



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### 3 ACTIVITIES AND METHODS

Fieldwork was planned and organized by geographic sectors. Fieldwork was completed by two teams; each comprised of a PWD EV scientist, accompanied by a NSA Naples Housing Zone Manager. Work was scheduled in advance, with notification provided to residents through the NSA Naples Housing Office.

#### 3.1 Deployment of Detectors

Radon detectors were deployed in 291 testable FH units on NSA Naples Support Site, and at 2 off-base Flag Officer's Quarters in the area. The majority of the detectors (282 units) were deployed between April 7 and April 21, 2022. Follow-up visits were required between April and August 10, 2022, to complete work at Flag Officer's Quarters and nine other previously inaccessible units. Deployment and retrieval dates for all detectors are provided in Appendix B-2.

#### 3.2 Retrieval of Detectors

Radon detectors were retrieved from all FH units between 27 Apr 2023 and 05 May 2023. Detectors deployed at eight (2.7%) of the FH units (listed below) were not present on-site at the end of the sample period, and were not retrieved or analyzed.

<b>Building/ Unit No.</b>	<b>Street</b>
2010-2	Shiloh
2016-2	Tarawa
2045-2	Essex
2101-2	Simon Lake
2122-1	Gettysburg
2126-2	Valley Forge
2154-2	Nimitz
2155-2	Nimitz

### 4 QUALITY CONTROL AND ASSURANCE

NAVRAMP QA/QC protocols were followed to demonstrate that the data set is scientifically sound, with acceptable precision and accuracy. These protocols included use of accredited devices, unexposed detectors (blanks), collocated duplicates, and controlled exposures (spikes).

Radonova RadTrak<sup>2</sup> detectors were selected for use in this project. Based on manufacturer's literature and information provided on the web sites of NAVRAMP- referenced certifying organizations, Radonova Radtrak2 ATDs meet or exceed all relevant technical specifications described in NAVRAMP Section 3.2.2 (Specifications and Approved Device lists are provided in Appendix C-1)

Co-located field duplicate samples were deployed at all sample locations. Field Blank samples were deployed at nine representative sample locations. Nine spiked samples were prepared by a NRPP-accredited radon chamber (Kansas State University). One co-located set of detectors was



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deployed within the PWD EV office for control purposes. All samples, duplicates, spikes, and field blanks were delivered by FedEx, together with two trip blanks, to the device manufacturer (Radonova, Inc) for analysis. All blanks and spikes were returned to the laboratory at the same time as the field detectors and were intermingled with and undistinguishable from the field detectors. Two sealed lab blanks were also included with the shipment.

- The relative percent difference (RPD) between laboratory results for collocated duplicate detectors was evaluated for three different subsets of data to evaluate the precision of the laboratory. This evaluation was completed in conformance with NAVRAMP guidelines and is presented in Appendix C-2
- Laboratory results for all nine Spikes prepared for this project are within  $\pm 21\%$  of the known exposure value (1589 pCi/L\*D) provided by the radon chamber. The average relative percent error was 7%, and exceeds NAVRAMP requirements. Spike results are tabulated and evaluated in Appendix C-3.
- Laboratory results for all retrieved field blanks were below the manufacturer's published lower limit of detection (LLD), and met NAVRAMP requirements. Field blank results are tabulated and evaluated in Appendix C-4.

## **5 COMMUNICATIONS**

NAVRAMP guidance was followed for all communications associated with implementation of this radon testing project, with the involvement of the Public Affairs Office (PAO) and Public Health Authority. It is important that all results are communicated to stakeholders through the chain of command, in conformance with the NSA Naples Radon Communication Plan.

Cooperation and coordination between PWD-EV and NSA Naples Housing Department was essential to planning and executing the work. Notification to residents was made through the chain of command well in advance of field activities, and access to information was made available to residents in a letter from the ICO and via the NSA Naples Radon Awareness web page.

A key communication, which facilitated the implementation of the work, was initiated by NSA Naples Housing Office: obtaining a letter from the ICO authorizing access to housing units that were not occupied during the survey. This letter is essential to efficient and effective deployment and retrieval of detectors.

Documentation of key communications is provided in Appendix D.



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### 6 TEST RESULTS AND REQUIREMENTS

The following testable family housing units exceeded the Navy Action Level of 4 pCi/L. The remainder of all testable family housing units did not exceed the Navy Action Level. All test results are valid based on QA/QC protocols.

<b>Building/ Unit No.</b>	<b>Street</b>	<b>Room</b>	<b>Result (Avg) (pCi/L)</b>
2150-2	Nimitz	Hall	<b>4.4</b>
2302	Villa Ischia	Hall outside bathroom	<b>4.0</b>
823	Off-site Villa Marilu	In basement	<b>12.7</b>
823	Off-site Villa Marilu	Outside L2 Bedroom	<b>12.6</b>
823	Off-site Villa Marilu	Salon (with fireplace)	<b>13.0</b>
824	Off-site Villa Colombaia	Family Room	<b>8.9</b>
824	Off-site Villa Colombaia	Service Foyer	<b>10.6</b>
824	Off-site Villa Colombaia	Staff Room	<b>10.6</b>

The four family housing units identified in the table above require mitigation measures to reduce the radon concentration to less than 4 pCi/L. Mitigation should be completed at the earliest opportunity, and based on NAVRAMP protocols, not later than 24 months from the date of this report.

NSA Naples Housing Office should consult with a qualified, Navy medical health professional and notify any current occupants of units that exceed the Navy Action Level.

All testable family housing units that have exceeded the Navy action level for radon, during this test period or during prior testing projects, should be monitored every two to three years, regardless of the mitigation status. These units include:

- 2037-2, 2145-1, and 2151-2, 2150-2, 2302, 823, and 824.

All testable family housing units, including those that have not exceeded the Navy action level for radon, require retesting every five years.

### 7 DOCUMENTATION REQUIREMENTS

The NSA Naples RMP should be updated to add all results that exceed the NAVRAMP guidelines Table 4-1 of the RMP. The impacted buildings and rooms should be added to the list of mitigation and monitoring requirements in Sections 5 and 6 of the RMP.

Under NAVRAMP, all installations are required to maintain a central data management system containing all valid data collected at the installation. All results were provided to NAVFAC EXWC on 22 Jun 2023, in the EXWC-prescribed format, for inclusion in the Radon Database.





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This report and all data should be retained as records. Consistent with current EPA and BUMED recommendations, and NAVRAMP, all radon test results shall be kept on file by the installation indefinitely.

### **8 FAMILY HOUSING REQUIREMENTS FOR THE NEXT 5 YEARS**

- Consult with Public Health Authority, PAO, Installation Leadership, and Installation and Regional Housing Leadership and notify residents of FH Units 2150-2, 2302, 823, and 824 of results and required actions.
- Complete mitigation of FH Units 2150-2, 2302, 823, and 824 within 24 months.
- Plan and budget to complete RPC 1 monitoring of units 2037-2, 2145-1, and 2151-2, 2150-2, 2302, 823, and 824 every 2 to 3 years.
- Plan and budget to complete RPC 3 retesting of all FH units every 5 years.

#### **8.1 Related NAVRAMP Requirements (Non-Family Housing)**

##### **8.1.1 Unaccompanied Housing (Non-Family Housing)**

Retest all Permanent party unaccompanied housing buildings every 5 years. (This is a new requirement for RPC3 sites; identified in the 2023 NAVRAMP Update). UH was last tested in 2014; therefore this is emergent requirement should be programmed, budgeted and executed at the earliest opportunity.

In future years, it may be most efficient to execute simultaneous projects for family housing and Permanent party unaccompanied housing.

##### **8.1.2 RPC 1 Mitigation and Monitoring for Non-residential facilities (Non-Family Housing)**

Operate, maintain, and optimize mitigation systems to ensure that the radon concentration in all mitigated rooms in occupiable non-residential shore facilities is reduced and maintained below 4 pCi/L. Execute design changes as necessary to comply with this standard. Retest all mitigated rooms in occupiable non-residential shore facilities every two to three years.

##### **8.1.3 Complete annual Updates to the Radon Management Plan**