

CHAPTER 30

RADON ASSESSMENT AND MITIGATION

30-1 Scope

This Chapter discusses the Navy aspects of the Department of the Navy's Radon Assessment and Mitigation Program (NAVRAMP). The purpose of NAVRAMP is to identify, assess, and mitigate the infiltration of radon into existing Navy buildings and to incorporate preventive practices in the design and construction of new buildings. NAVRAMP provides for compliance with the procedural requirements of the TSCA. This radon chapter applies to all Navy activities worldwide. Mitigation and Prevention requirements of section 30-5.3.b and 30-5.3.c, respectively, do not apply to non-Navy owned buildings. Navy tenant activities should consider mitigation and advise the lesser when applicable radon concentrations exceed the action level of 4 pCi/L. Activities should adhere to the prevention requirements of section 30-5.3.c when considering the design and construction of new buildings for long term leases (e.g., lease, limited partnerships, etc.) or significant modifications to existing buildings. Activities must evaluate all existing and new lease agreements to ensure Navy occupancy is or will be under similar radon exposure protection obtained by implementing NAVRAMP in Navy owned buildings.

30-1.1 References. Relevant references are:

- (a) Toxic Substance Control Act 15 USC 2601 et seq.;
- (b) 29 CFR 1910.20C (8) OSHA Access to Employee Exposure and Medical Records.

30-2 Legislation

30-2.1 Toxic Substance Control Act. TSCA (reference (a)) required that all Federal departments or agencies that own Federal buildings conduct a study to determine the extent of radon contamination in such buildings. They must provide results of the study to EPA. As required by the TSCA, EPA submitted to Congress a consolidated report of the studies from Federal departments or agencies, including one submitted by the Navy.

30-3 Terms and Definitions

30-3.1 Mitigation System. Any system or steps designed to reduce radon concentrations in the indoor air of a building.

30-3.2 Occupied Building. A building occupied more than 4 hours per day. For the purposes of this chapter, the term "building" includes both housing and non-housing structures.

30-3.3 Modified Structure. A building significantly altered by either changing the original number or type of windows, doors, ground slabs, walls, or otherwise making modifications in any manner to significantly change the air exchange or flow in the structure.

30-3.4 Picocuries. A unit of measurement used to describe certain types of nuclear radiation. A curie is the amount of any radionuclide that undergoes exactly 3.7×10^{10} radioactive disintegrations per second. A picocurie is one trillionth (10^{-12}) of a curie, or 0.037 disintegrations per second.

30-3.5 Picocurie per liter (pCi/L). A common unit of measurement of the concentration of radioactivity in a fluid (liquid or gas). A picocurie per liter corresponds to 0.037 radioactive disintegrations per second in every liter of fluid.

30-3.6 Radon. Radon. A colorless, odorless, radioactive gas formed by the decay of radium. Radon exists in varying amounts in all soils, rocks, and some groundwater supplies worldwide. Under certain conditions, it can infiltrate into and concentrate to unacceptable levels in buildings.

30-3.7 Validated Monitoring Results. A radon test that meets the requirements of NAVRAMP (e.g., a type of radon detection device; sampling strategies, procedures, and intervals; QA/QC; etc.).

30-4 Requirements

30-4.1 General. Section 309(a) of TSCA required the head of each Federal department or agency that owned Federal buildings to conduct a study to determine the extent of radon in such buildings. In the case of Federal buildings using a nonpublic water source (such as a well or other groundwater), TSCA also required an evaluation of radon in the water.

The TSCA required the study submitted to the EPA not later than 1 June 1990. The Navy submitted the results available at that date, and submitted updated information two times since to EPA. Besides assessing the level of radon in Navy buildings, NAVRAMP, under certain conditions requires the mitigation of radon in existing buildings and the prevention of radon buildup in new buildings.

30-5 Navy Policy

30-5.1 General. The EPA approved NAVRAMP as the plan to identify, mitigate, and prevent radon in Navy-occupied buildings. All Navy installations shall implement the NAVRAMP testing program to identify the level of indoor radon. Navy installations shall undertake mitigation measures in buildings determined to have indoor radon levels above 4pCi/L. They shall incorporate appropriate radon reduction techniques into the design and construction phases of new structures and significantly modified structures as a preventive measure where necessary because of regulatory requirements, historical data, or geological conditions.

Naturally occurring radon exposure is part of natural radiation background, and background exposures are not considered occupational exposure. Reference (b) notes that, "Exposure or exposed means that an employee is subjected to a toxic substance or harmful physical agent in the course of employment ... but does not include situations where the employer can demonstrate that the toxic substance or harmful physical agent is not used, handled, stored, generated, or present in the workspace in any manner different from typical non-occupational situations."

30-5.2 Applicable Provisions. The U.S. Navy shall institute the following provisions under NAVRAMP:

- Identify activities where indoor concentration of radon in occupied buildings exceeds the EPA-recommended action level, currently 4 picocuries per liter (4pCi/L).
- Maintain a central data management system containing all validated monitoring results of Navy and Marine Corps buildings (both housing and non-housing) tested for radon under NAVRAMP.
- Mitigate the indoor radon levels in buildings to below EPA-recommended action level of 4pCi/L.
- Perform preventive maintenance on mitigation systems and periodic retesting of buildings with mitigation systems to ensure that subject systems are operating properly to reduce the building's radon levels.
- Ensure that building designs include appropriate radon resistant (prevention) techniques where necessary due to applicable regulatory requirements, historical data, and geological conditions at the location.

30-5.3 The NAVRAMP Program. The NAVRAMP consists of testing, mitigation, and prevention.

a. **Testing.** Activities shall test occupied buildings to determine indoor levels of radon. Radon testing of buildings in an activity typically consists of the following phases:

- **Screening.** Activities shall select a statistically significant sample of structures, mainly housing, hospitals, bachelor quarters, schools, child-care centers, and brigs. A “screening” becomes an “assessment” if the minimum statistically significant number of buildings (31 buildings per installation or 31 housing units per housing area) is equal to or greater than the total number of occupied buildings.
- **Assessment.** If during the screening process activities detect radon and confirm the level exceeds the EPA-recommended action level of 4pCi/L, then the activity shall measure every occupied building in the activity for radon.
- **Periodically Monitoring.** Activities shall periodically perform maintenance on mitigation systems and monitor structures where mitigation measures have been installed. They shall re-test structures that have been significantly modified to ensure that levels are still below 4pCi/L.

b. **Mitigation.** Activities shall install a mitigation system in buildings determined to have indoor radon levels above the EPA-recommended action level of 4pCi/L to reduce action levels below the EPA-recommended level of 4pCi/L. They shall schedule mitigation steps conforming to the following priority scheme:

<u>Cat.</u>	<u>Radon Levels</u> (pCi/L)	<u>Action</u>
1	0 to 4	No action required
2	4 to 20	Mitigation within 2 yr.
3	20 to 200	Mitigation within 6 mo.
4	> 200	Mitigation within 3 wk.

c. **Prevention.** Activities shall incorporate appropriate radon reduction techniques into the design and construction phases of new structures or significant modifications to existing buildings” (where necessary due to applicable regulatory requirements, historical data, and geological conditions at the location) to prevent indoor radon levels from exceeding the action levels of 4pCi/L.

30-5.4 Program Funding Requirements

a. CNO will centrally fund the cost of managing NAVRAMP as part of the NEPSS centrally-managed funds.

b. The cost of providing technical support (e.g., testing, diagnostics, mitigation, and prevention) specifically related to an activity, is reimbursable to COMNAVFACENGCOM by the activity or its chain of command.

c. Projects for mitigation and prevention beyond the funding capability of the activity may be eligible for centrally-managed funds in the O&M,N and MILCON appropriations. Conditions covered in OPNAVINST 11010.20F, Facilities Projects Manual, further restrict the availability of centrally managed funds in O&MN appropriations.

30-6 Responsibilities

30-6.1 CNO (N45) shall:

- (a) Assess the impact of proposed radon legislation and regulations on the Navy.
- (b) Issue radon policy and guidance as needed.

30-6.2 BSOs shall:

- (a) Identify and submit environmental compliance projects required to bring activities into compliance with applicable federal, state, and local regulations and Navy policy requirements.
- (b) Budget sufficient resources to maintain and demonstrate compliance with Navy policy and Federal, state, and local radon monitoring, mitigation, and prevention requirements.

30-6.3 COMNAVFACENGCOM shall:

- (a) Manage NAVRAMP.
- (b) Designate within its organization a Radon Center of Expertise.
- (c) Develop and manage a Navy-wide radon testing data system.
- (d) Revise technical documents and manuals to reflect designs required to reduce indoor radon levels in buildings.
- (e) Provide technical assistance regarding:
 - Monitoring of radon levels within buildings.
 - Diagnostics for selection of mitigation practices.
 - Design of mitigation and prevention practices.
 - Construction of mitigation and prevention practices.
 - Operation and maintenance plans for mitigation equipment.
- (f) Implement as requested the requirements of NAVRAMP at Navy activities and include training on radon risks and management, as requested.
- (g) Ensure that testing data meets the requirements of NAVRAMP (i.e., QA/QC).
- (h) Maintain an integrated Navy-wide database and management information on radon testing data and mitigation projects planned and performed.
- (i) Produce an annual Navy-wide radon testing and mitigation summary report.

30-6.4 BUMED shall:

- (a) Assist COMNAVFACENGCOM in areas of radon public health assessment and communication.
- (b) Evaluate the appropriateness of radon action levels and mitigation schedules for Navy installations.