October 14, 2016

State Representative Thomas Sherman
Governor's Taskforce on The Seacoast Cancer Cluster Investigation
New Hampshire Department of Health and Human Services
129 Pleasant Street
Concord, NH 03301-3852

Dear State Representative Thomas Sherman and the Governor's Taskforce on the Seacoast Cancer Cluster Investigation,

I am writing in response to your telephone call to the Portsmouth Naval Shipyard on September 29, 2016 on behalf of the Governor's Taskforce on the Seacoast Cancer Cluster Investigation. As a matter of introduction, I am the Director of Radiological Controls for the Shipyard and I am responsible for ensuring the proper control of radioactivity and radiation during work performed on nuclear-powered ships. My staff has the responsibility to provide direct oversight of this work to ensure that there is no measurable effect on the Shipyard workforce, the public, or the environment from Shipyard operations. Each of the areas you inquired about in your telephone call is addressed below and in the enclosed documents.

The Portsmouth Naval Shipyard was established on June 12, 1800 during the administration of President John Adams and is the U.S. Navy's oldest continuously operating shipyard. In these 216 years, we have not only played an important role for the Navy, but an important role in our Seacoast Community. We recognize the great support we have received through the years from the Seacoast Community and our families are part of this great community in which we work.

Portsmouth Naval Shipyard was first authorized to accomplish work on nuclear-powered submarines in July 1958. The first nuclear submarine built at Portsmouth was launched in late 1958. Since 1959, we have conducted overhauls and performed maintenance on many different classes of nuclear-powered submarines. We recognize the importance of our maintenance mission. Navy warships are deployed around the world every hour of every day to provide a credible "forward presence," ready to respond on the scene wherever America's interests are threatened. Nuclear propulsion plays an essential role in this protection, providing the mobility, flexibility, and endurance that today's Navy requires to meet a growing number of missions. Today, more than 40 percent of the Navy's major combatants are nuclear-powered. Enclosure (1) provides overview material regarding the U.S. Naval Nuclear Propulsion Program (NNPP).

Concerning environmental protection and protection of the public surrounding the Shipyard, the NNPP has a comprehensive environmental monitoring program at each of its major installations and facilities, including nuclear-capable shipyards and the homeports of nuclear-powered ships (Enclosure(2) attachment (1)). This monitoring consists of analyzing harbor sediment, water, and marine life samples for radioactivity associated with naval nuclear propulsion plants; radiation monitoring around the perimeter of support facilities; and airborne and liquid effluent monitoring. Environmental samples from each of these harbors are also independently checked at least annually by a Department of Energy laboratory to ensure analytical procedures are correct and standardized. Independent environmental monitoring has also been conducted by the U.S. Environmental Protection Agency in U.S. harbors and the New Hampshire Department of Health and Human Services in the area around Portsmouth Naval Shipyard (Enclosure (2) attachment (3)). The results of these extensive, detailed surveys are consistent with Navy results. These surveys have again confirmed that U.S. naval nuclear-powered ships and support facilities, including Portsmouth Naval Shipyard, have had no discernible effect on the quality of the environment.

It is a long standing policy of the NNPP to reduce exposure to personnel from ionizing radiation associated with naval nuclear propulsion plants to a level as low as reasonably achievable. No civilian or military personnel in the NNPP have ever, in 60 years of operation, exceeded the Federal lifetime limit for occupational radiation exposure. In fact, no civilian or military personnel in the NNPP have exceeded the annual radiation exposure limit of 5 Rem per year (self-imposed by the NNPP 27 years before it was adopted by the Nuclear Regulatory Commission in 1994) since 1968. Further, no civilian or military personnel in the NNPP have exceeded even 40 percent of the annual occupational radiation exposure limit since 1979. The average radiation exposure for an NNPP shipyard worker in 2015, such as those workers at the Portsmouth Naval Shipyard, was 0.017 Rem. This average exposure is equivalent to less than 3 weeks of background radiation exposure, less than 2 routine chest x-ray examinations, less than 0.4 percent of the Federal annual limit for occupational radiation exposure, and 17 percent of the Federal annual radiation exposure limit for members of the general public. Naval nuclear work is engineered to contain radioactive material at the worksite to protect the worker and the environment (see enclosure (3)).

U.S. nuclear-powered ships are designed to exacting and rigorous standards, built to survive wartime attack, include redundant systems, and are operated by highly-trained crews using rigorously applied procedures. Portsmouth Naval Shipyard has Emergency Response Plans, equipment, qualifications, and training in place that define NNPP responses to a wide range of emergency situations. These plans are regularly exercised to ensure that proficiency is maintained. These exercises involve the participation of the entire Shipyard, utilize the extensive facilities and equipment staged to support emergency response, and verify the ability to collect and analyze radiological surveys and environmental samples. These exercises demonstrate that our Shipyard is well prepared to respond to any emergency. The Shipyard maintains close relationships with civil authorities to ensure that communications and emergency response are coordinated, if ever needed. The Shipyard continually evaluates and improves our emergency preparedness (see enclosure (4)).

I have provided enclosures (1-4) and supporting attachments to expand upon the information provided above. I hope this information satisfies your request. I welcome any additional questions you might have after a review of the enclosed materials. I can be reached directly at telephone extension (207)438-2742 or via email at stephen.fahey@navy.mil.

Sincerely,

S. B. FAHEY
Director, Radiological Controls
Portsmouth Naval Shipyard

Enclosures:
1. The United States Naval Nuclear Propulsion Program, March 2014
2. Radiological Environmental Monitoring
   Attachment (1) REPORT NT-16-1, May 2016
   (2) Portsmouth Naval Shipyard Radiological Environmental Monitoring Report
   (3) EPA-402-R-01-013 of November 2001, Radiological Survey of Portsmouth Naval Shipyard
3. Radiation Safety Programs
   Attachment (1) REPORT NT-16-2, May 2016
4. Emergency Preparedness and Response

RADIOLOGICAL ENVIRONMENTAL MONITORING

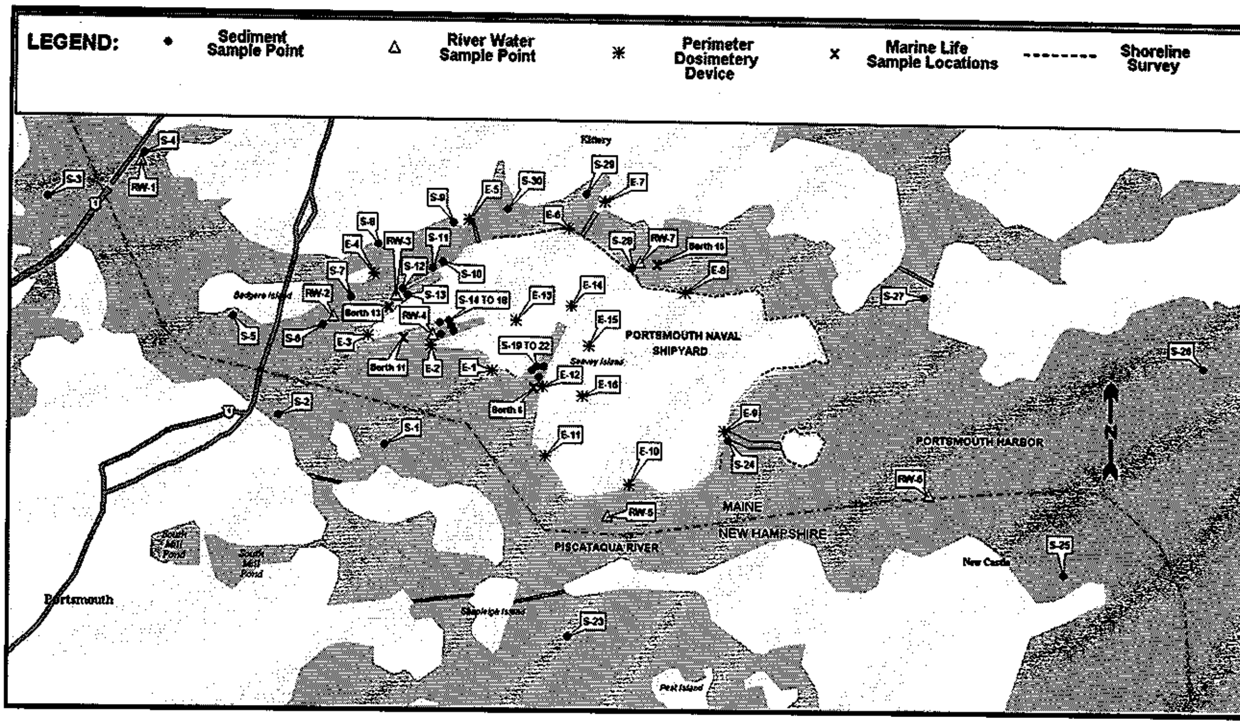
Beginning in 1957, before radiological work was performed on nuclear-powered submarines, a baseline study of the radiological environment of the Portsmouth Naval Shipyard and surrounding waters was conducted. Radiological environmental monitoring continues through the present.

Information on Radiological Environmental monitoring conducted by the U.S. Navy is published annually in attachment (1), entitled *Environmental Monitoring and Disposal of Radioactive Wastes from U.S. Naval Nuclear-Powered Ships and Their Support Facilities*. Since 1966, the information in this attachment has been compiled and provided annually to other Federal Agencies, States, Congress, and the public. This report is also available online at http://nnsa.energy.gov/ourmission/poweringnavy/annualreports.

Attachment (2) is the Portsmouth Naval Shipyard Radiological Environmental Monitoring Report. This annual report provides the results of radiological environmental monitoring performed by Portsmouth Naval Shipyard at the Shipyard. The report compiling Portsmouth Naval Shipyard environmental monitoring information for 2015 was forwarded to the New Hampshire Radiological Health Section on 21 September 2016, consistent with past years.

The radiological environmental monitoring program at the Shipyard includes routine sampling of river/harbor sediment, river/harbor water, marine life, and exhaust stack emissions, as well as shoreline surveys and monitoring perimeter radiation levels. Figure 1 is a map of the Shipyard, the surrounding area and the locations where samples are drawn.

Figure 1.
Portsmouth Naval Shipyard Environmental Monitoring Sample Locations.



Some of the specifics for each sampling modality include:

1. River/Harbor Water Samples. River/harbor water samples are collected during the first month of each calendar quarter. Seven samples are collected at and around the Shipyard. The harbor samples are collected in areas where nuclear-powered ships are berthed and from surrounding areas. Each sample consists of river/harbor water collected from near the surface of the water.

2. River/Harbor Sediment Samples. River/harbor sediment samples are collected during the first month of each calendar quarter. Thirty samples are collected at and around the Shipyard. The harbor samples are collected in areas where nuclear-powered ships are berthed and from surrounding areas. Each sample consists of river/harbor sediment collected using a commercially-available Birge-Ekman dredge modified to sample a thirty-six square inch by approximately one inch deep layer.

3. Marine Life. Marine life samples are collected during July of each year. Samples of marine life include specimens such as mollusks, crustaceans, and marine plants. The marine life

samples are collected in areas where nuclear-powered ships are berthed and from surrounding areas.

4. Exhaust Stack Discharges. Air exhausted from facilities engaged in work that could cause airborne radioactivity is continuously sampled for radiological particulates during the year. For comparison purposes, background air is continuously sampled, away from monitored facilities, with filters which are collected weekly.

5. Shoreline Surveys. During the second and fourth quarter of each year, shoreline areas uncovered at low tide are surveyed with sensitive calibrated instruments for radiation levels to determine if any radioactivity has been washed ashore. Shoreline surveys are conducted on accessible shoreline areas. Survey measurements of background radiation levels are performed approximately 50 feet inland from the high water mark of the shoreline survey areas.

6. Perimeter Radiation Levels. Sensitive thermoluminescent dosimeters (TLDs) are posted throughout each calendar quarter to provide additional assurance that operations at Portsmouth Naval Shipyard do not cause increased radiation exposure to the general public. TLDs are posted at the perimeter locations shown in Figure 1 to measure the accumulated radiation exposure at these locations. For comparison purposes, TLDs are also posted on the same schedule to the north, west, and south of the Shipyard in York, Maine, and Newmarket and North Hampton, New Hampshire, respectively. These TLDs are posted to provide a comparison between perimeter TLD results and naturally occurring background radiation levels in the surrounding areas.

Approximately fifty off-site TLDs are also posted in the seacoast area to support the Shipyard's Radiological Emergency Response Program, which is discussed in enclosure (4) of this letter. These TLD's are read quarterly; results consistently show no measureable increase in background radiation levels due to Shipyard operations.

The results of the radiological environmental monitoring program consistently confirm that radiological controls associated with naval nuclear-powered ships at Portsmouth Naval Shipyard are effective in protecting the shipyard workforce, the environment and the health and safety of the public. Each year, this report has shown that Portsmouth Naval Shipyard operations have not caused an increase in the measurable general background radioactivity of the environment, and that radiation exposure to the general public is not distinguishable from that resulting from natural background radiation.

For validation of the accuracy of the Shipyard's analysis procedures and equipment, an annual cross-check is performed by an independent U. S. Department of Energy laboratory, Knolls Atomic Power Laboratory (KAPL). The Shipyard quantitatively and qualitatively analyzes an air filter and a simulated sediment/water sample that have been prepared by KAPL. Additionally, twenty-five percent of the sediment samples collected during the first quarter of each year and all routine marine life samples are sent to KAPL for analysis and comparison with Shipyard results. The Shipyard consistently demonstrates an acceptable level of proficiency for the analysis of environmental samples.

The U.S. Environmental Protection Agency National Air and Radiation Environmental Laboratory published three exceptionally detailed radiological survey reports over the history of the Shipyard. The reports are entitled *Radiological Survey of Portsmouth Naval Shipyard*, and are available at https://nepis.epa.gov. They present the results of radiological surveys conducted in July 1977, September 1989, and September 1997. Attachment (3) contains the EPA report issued in 2001 documenting results of the 1997 radiological surveys. The purpose of the surveys was to assess whether the nuclear work at the Shipyard has created elevated levels of environmental radioactivity in and around the Shipyard that could expose nearby populations or contaminate the environment.

During the EPA surveys, samples were collected and radiation levels were measured. During the 1997 survey specifically, 135 samples were collected from 72 sampling locations. Samples included drinking water, harbor water, sediment, sediment cores, and biota (marine life). Radiation level measurements were performed at 48 different sites. The 1997 survey detected no radioactivity associated with the NNPP. All three surveys have concluded that the Shipyard's nuclear work have resulted in no increase in radioactivity that would result in significant population exposure or contamination of the environment.

The New Hampshire Department of Health and Human Services (DHHS), through its Division of Public Health Services (DPHS) has a well-established, continual environmental monitoring program for the three nuclear facilities: Seabrook Nuclear Power Station; Vermont Yankee Nuclear Power Station; and Portsmouth Naval Shipyard.

At DPHS, the Radiochemistry Laboratory routinely performs radioanalysis of environmental samples of air, water, soil, sand, sediment, vegetation, milk, fish, lobster, mussels, atmospheric particulate material, and direct gamma radiation levels obtained from various sites within the State. During 2010, DHHS personnel collected a total of 1,325 samples from locations around the three nuclear facilities, as well as samples from various control locations throughout New Hampshire. An estimated 10,000 individual measurements were performed on these samples.

DHHS's radio-analytical data indicate no radioactivity greater than the normal and expected background. Analysis of posted TLDs showed no radiation exposure levels above normal background levels over a 10-year period. The latest report available on the internet regarding this monitoring is dated 2010 and is located at http://www.dhhs.nh.gov/dphs/lab/documents/rem2010.pdf.

RADIATION SAFETY PROGRAMS

Attachment (1), entitled *Occupational Radiation Exposure from U.S. Naval Nuclear Plants and their Support Facilities*, contains a report of radiation exposure received by shipyard workers and sailors serving aboard nuclear-powered ships. Since 1966, the information in this report has been compiled and provided annually to other Federal Agencies, States, Congress, and the public. This report is also available online at http://nnsa.energy.gov/ourmission/poweringnavy/annualreports.

Naval reactor plant shielding is conservatively designed to minimize radiation exposure to personnel. Personnel operating the Navy's nuclear-powered ships receive much less radiation exposure in a year than the average U.S. citizen does from natural background and medical radiation exposure. For example, the occupational exposure received by the average nuclear-trained sailor living onboard one of the Navy's nuclear-powered ships in 2015 was less than a twentieth of the radiation received by the average U.S. citizen from natural background sources that year.

Naval bases and shipyards minimize the number of places where radioactive material is allowed. Stringent controls are in place during the movement of all radioactive material outside these nuclear support facilities. A radioactive material accountability system is used to ensure that no radioactive material is lost or misplaced in a location where personnel could unknowingly be exposed. Regular inventories are required for every item in the radioactive material accountability system All personnel assigned to a shipyard are trained to recognize radioactive material and to take immediate action if radioactive material is discovered out of place. Shipyards are required to minimize the generation of radioactive material and to promptly dispose of radioactive material in accordance with applicable regulations.

Access to radiation areas is controlled by signs and barriers. Personnel are trained in the access requirements, including the requirement to wear dosimetric devices to enter these areas. Dosimetric devices are also posted near the boundaries of these areas to verify that personnel outside these areas do not require monitoring. Specifically, the dosimetric devices posted on the boundaries of radiological areas validate that unmonitored shipyard personnel do not receive more than 0.100 Rem per year of radiation exposure from NNPP work, the same amount of exposure allowed for members of the general public by the Nuclear Regulatory Commission. Frequent radiation surveys to validate the boundaries of radiological areas are required using sensitive instruments that are checked before use and calibrated regularly.

Perhaps the most restrictive regulations in the NNPP's radiological controls program are those for controlling radioactive contamination. Work operations involving the potential for spreading radioactive contamination use containments to prevent personnel contamination or the generation of airborne radioactivity. The controls for radioactive contamination are so strict that precautions sometimes had to be taken in the past to prevent tracking contamination from the world's atmospheric fallout and natural sources outside radiological areas *into* radiological spaces because the contamination control limits used in the nuclear areas were below the levels of fallout and natural radioactivity occurring outside in the general public areas. The NNPP's basic approach is to contain radioactivity at the source. In addition to providing better control over the spread of radioactivity, this method has reduced radiation exposure. A basic requirement of contamination control is to monitor all personnel leaving any area where radioactive contamination could possibly occur. Workers are trained to survey themselves (e.g., frisk), and their performance is checked by the radiological controls personnel. Frisking of the entire body is required, normally using sensitive field survey instruments. Trained radiological controls personnel frequently survey for radioactive contamination with sensitive calibrated field instruments. These surveys are reviewed by supervisory personnel to verify that no abnormal conditions exist.

The NNPP's policy is to prevent significant radiation exposure to personnel from internal radioactivity. Airborne radioactivity is controlled to one-tenth of the levels allowed by U.S. Environmental Protection Agency guidance. Radiation workers are also periodically monitored with sensitive laboratory equipment to ensure they have not ingested or inhaled NNPP radioactivity. As a result, no shipyard workers have received measurable internal contamination from NNPP work in over 20 years.

Since the beginning of the NNPP, personnel radiation exposure has been monitored using dosimetric devices worn on an individual's body. Dosimetric devices are worn on the trunk of the body, normally at the waist or chest. In some special situations, additional dosimeters are worn at other locations, for example on the hands, fingers, or head. Portsmouth Naval Shipyard is accredited under the National Voluntary Laboratory Accreditation Program (Laboratory Code 100565-11) for processing ionizing radiation dosimetry. Portsmouth Naval Shipyard is regularly tested by outside organizations to ensure consistency with accepted standards.

Compliance with radiological controls requirements is checked frequently by radiological controls personnel, as well as by other personnel not affiliated with the radiological controls organization. An independent radiological audit group reviews compliance with all radiological controls requirements and the audit group's findings are regularly reported directly to senior shipyard management, including the Shipyard Commander. The U.S. Department of Energy also has a representative at the Shipyard who reports to the Director, Naval Nuclear Propulsion. At least one assistant to the Department of Energy representative is assigned full-time to audit and review radiological controls. NNPP Headquarters personnel also conduct periodic inspections of radiological controls in the Shipyard.

Attachment (1) also discusses the results of studies on the health effects of low-level radiation exposure on people, including workers at Portsmouth Naval Shipyard, beginning on page 40. The biological effects of ionizing radiation exposure have been studied for over a century, long before the advent of nuclear power. The large number of high quality studies on the effects of radiation exposure on human beings led the National Academy of Sciences to conclude that there is more evidence about the effects of ionizing radiation exposure than most, if not all, other environmental agents that could affect the general public. A few of the studies are discussed below. As discussed in these studies, the consistent conclusion is that the risk of health effects from ionizing radiation exposure is very low and small compared to other commonly accepted risks at work and in everyday life.

The National Academy of Sciences - National Research Council, in 2006, published a report titled, "Health Risks from Exposure to Low Levels of Ionizing Radiation, BEIR VII-Phase 2". It was a report compiled by a committee of scientific experts responsible for assessing health risks from exposure to low levels of ionizing radiation. The BEIR committee concluded that studies of populations chronically exposed to low-level radiation have not shown consistent or conclusive evidence upon which to determine the risk of cancer induction from low-level radiation exposure, if any exists.

Despite the lack of consistent or conclusive evidence from such low-dose studies to date, there are low-dose groups that have been, and are currently being, studied. Such groups include persons exposed as a result of medical procedures; exposed to fallout from nuclear weapons testing; living near U.S. commercial nuclear installations; living in areas of high natural background radiation; and occupational exposure to low doses of radiation. The overall conclusion reached by the National Academy of Sciences from reviewing these studies was:

> Studies of populations chronically exposed to low-level radiation. . . have not shown consistent or conclusive evidence of an associated increase in the risk of cancer (BEIR V, 1990).

The National Cancer Institute also completed a study of cancer in 1990 for U.S. populations living near 62 nuclear facilities that had been in operation prior to 1982. This study included commercial nuclear power plants and Department of Energy facilities that handle radioactive materials. The National Cancer Institute study concluded that there was no evidence that leukemia or any other form of cancer was generally higher in the counties near the nuclear facilities than in the counties remote from nuclear facilities (National Cancer Institute, "Cancer In Population Living Near Nuclear Facilities," NIH Publication No. 90-874, July 1990).

In 1978, Congress directed the National Institute for Occupational Safety and Health (NIOSH) to perform a study of Portsmouth Naval Shipyard workers who were occupationally exposed to low-level radiation. Congress also chartered an independent oversight committee of nine national experts to oversee the performance of the NIOSH study in order to ensure technical adequacy and independence of the results. In December 1980, the NIOSH researchers completed the first report on a detailed study of the mortality among employees of the shipyard. The report concluded that "Excesses of deaths due to malignant neoplasms and specifically due to neoplasms of the blood and blood-forming tissue, were not evident in civilian workers at Portsmouth Naval Shipyard. . . ." A second study was also conducted, to compare the work and radiation histories of persons who died of leukemia, with persons who did not. In this analysis, again, no relationship was found between leukemia and radiation. NIOSH published the results of an update to the 1980 study in the July 2004 edition of the Journal of Occupational and Environmental Medicine (S.R. Silver, et. al, "Differences in Mortality by Radiation Monitoring Status in an Expanded Cohort of Portsmouth Naval Shipyard Workers" Journal of Occupational and Environmental Medicine 2004; 677-690). The NIOSH study found nothing to conclude that the health of shipyard workers has been adversely affected by low levels of occupational radiation exposure incidental to work on nuclear-powered ships. The study showed no statistically significant cancer risks linked to radiation exposure, when compared to the general U.S. population. Further, the overall death rate among Portsmouth Naval Shipyard occupational radiation workers was less than the death rate for the general U.S. population.

In 1991, researchers from Johns Hopkins University, Baltimore, Maryland, completed a comprehensive epidemiological study of the health of workers at the six naval shipyards (including Portsmouth Naval Shipyard, discussed above) and two private shipyards that serviced U.S. naval nuclear-powered ships (G. M. Matanoski, et. al, "Health Effects of Low-Level Radiation in Shipyard Workers," Johns Hopkins University Department of Epidemiology School of Hygiene and Public Health, June 1991). This independent study did not show any cancer risks linked to radiation exposure. Additionally, it found no evidence to conclude that the health of people involved in work on U.S. naval nuclear-powered ships has been adversely affected by exposure to low levels of radiation incidental to this work.

The policies discussed above, according to the standard methods for estimating risk, reduce the cancer risk to the group of personnel occupationally exposed to radiation associated with naval nuclear propulsion plants to less than the risk these same personnel have from exposure to natural background radiation.

EMERGENCY PREPAREDNESS AND RESPONSE

The likelihood of an accident resulting in radioactivity from the nuclear reactor core itself being released from the ship to the environment is extremely small. However, the U.S. Navy never dismisses such an accident scenario as something that does not deserve serious consideration. The U.S. Navy has made thorough studies on: what could bring about a release of radioactivity from the ship during highly unlikely accident scenarios, what effect such a release could have on the environment, and what emergency plans would be required for such a situation.

All U.S. nuclear-powered warships (NPWs) use pressurized water reactors (PWRs). PWRs have an established safety history, their operational behavior and risks are understood, and they are the basic design used for approximately 60% of the commercial nuclear power plants in the world. The mission that naval reactors support is different from the mission of commercial reactors. All U.S. NPWs are designed to survive wartime attack and to continue to fight while protecting their crew against hazards. They have well-developed damage control capabilities, redundancy, and backup in essential systems. In addition, to support the mission of a warship, naval reactors are designed and operated in such a way as to provide rapid power level changes for propulsion needs, ensure continuity of propulsion, and have long operational lifetimes. These are the significant differences between U.S. NPW and commercial reactor missions. Also, the fact that operators and crews have to live in close proximity to the nuclear reactor requires that the reactor have redundant systems and comprehensive shielding and be reliable and safe. For these reasons, naval reactor plant designs are different from commercial reactors, which results in enhanced capability of naval vessels to operate safely under harsh battle conditions, or even more safely during peacetime operations.

There are at least four barriers that work to keep radioactivity inside the ship, even in the highly unlikely event of a problem involving the reactor. These barriers are the fuel itself, the all-welded reactor primary system including the reactor pressure vessel containing the fuel, the reactor compartment, and the ship's hull. Although commercial reactors have similar barriers, barriers in U.S. NPWs are far more robust, resilient and conservatively designed than those in civilian reactors due to the fundamental differences in mission.

Operation of naval reactors is also different from that of commercial reactors because of the different purposes they serve. First, U.S. naval reactors are smaller and lower in power rating than typical civilian reactors. The largest U.S. naval reactors are rated at less than one-fifth of a large commercial reactor plant. Also, U.S. naval reactors do not normally operate at full power.

Second, the naval reactor power level is primarily set by propulsion needs, and not by the ship's other service needs, which are also powered by the reactor but require a small fraction of the power required for propulsion. Consequently, reactors are normally shut down shortly after mooring and they are normally only started up shortly before departure, since only very low power is required for propulsion in port. While in port, electric power for service needs is provided from shore service supplies.

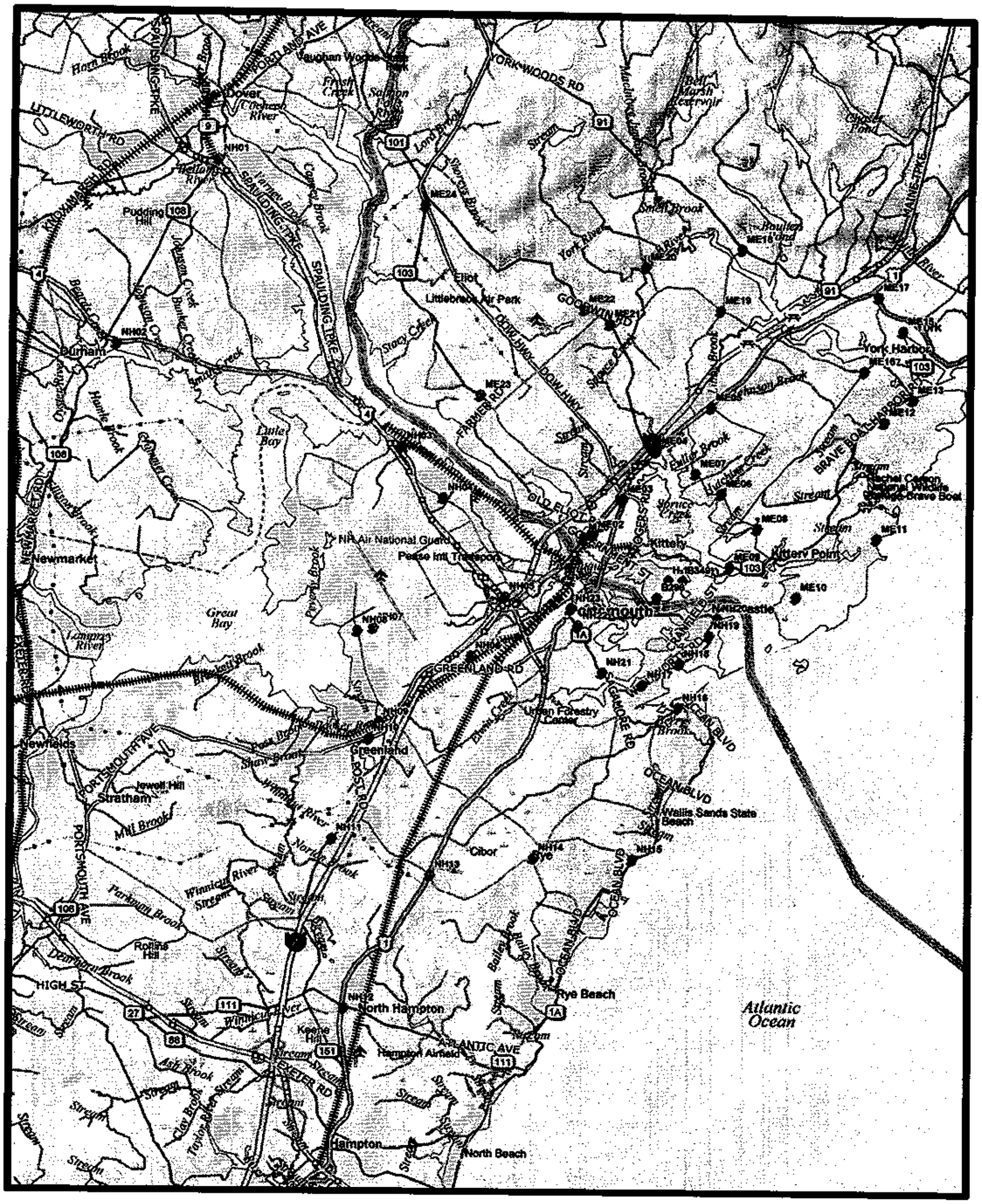
From these two facts alone, it follows that the amount of radioactivity potentially available for release from a reactor core of a U.S. NPW moored in port is less than about one percent of that for a typical commercial reactor.

Planning for emergencies is based on extensive technical analysis, as well as recommendations and guidance provided by numerous agencies experienced in emergency planning, including the Department of Homeland Security, the Navy, the Department of Energy, the Nuclear Regulatory Commission, the Environmental Protection Agency, the National Council on Radiation Protection and Measurements, and the International Atomic Energy Agency.

Each Naval Nuclear Propulsion Program (NNPP) site, including Portsmouth Naval Shipyard, maintains equipment, facilities, response plans, responder qualifications and continuing training programs to support response to a range of emergencies. Included in this emergency response capability is the ability to collect and analyze radiological surveys and environmental samples both on and off the Shipyard to confirm that the emergency has not had a discernable impact on the sailors, workforce, public, or the environment.

The Shipyard maintains approximately 50 off-site emergency thermoluminescent dosimeters (TLDs) in New Hampshire and Maine. These TLDs are posted at various locations around the Shipyard (see Figure 2) and are read quarterly. Results from processing these off-site TLDs consistently show no measurable increase in background radiation levels due to Shipyard operations. In the highly unlikely event of a radiological emergency at the Shipyard, these TLDs would be used to verify the emergency does not pose a risk to the public or the environment.

Figure 2.
Portsmouth Naval Shipyard Emergency TLD Locations.



As a whole, the NNPP has approximately 800 Radiological Controls Technicians and 5000 Contamination Workers throughout the U.S. trained in emergency response that could be called upon if needed.

This response is in addition to other federal resources our program could call upon as part of being assigned as the Coordinating Agency for the Federal response in the highly unlikely event of a NNPP radiological emergency per the National Response Framework.

One crucial component of our emergency preparedness is our civil authority outreach programs. If a radiological emergency were to ever occur on a NPW, state and local civil authorities in New Hampshire and Maine would be promptly notified and kept informed of the situation. With the support of the NNPP and Shipyard personnel, civil authorities would determine appropriate public actions, if any, and transmit this information via their normal emergency communications methods.

Portsmouth Naval Shipyard maintains close relationships with civil authorities to ensure that communications and emergency responses are coordinated, if ever needed. Periodic exercises are conducted with State and local officials, demonstrating the Navy's commitment to work as a team in response to emergency situations. The emergency response coordination and cooperative communication we experienced during the fire on-board ex-MIAMI is a testament to this solidly established, effective outreach, even though the fire did not result in any concerns for the reactor.

As discussed above, the largest naval reactors are rated at less than one-fifth of a large U.S. commercial nuclear power plant. In addition, since reactor power is directly linked to propulsion requirements, naval nuclear propulsion plants typically operate at low power when the ship is close to shore where high speeds are not required and are normally shut down when in port. Less than about 1 percent of the radioactivity contained in a typical commercial nuclear power plant could be released from a naval nuclear propulsion plant, limiting the possible dose to the general public and the size of the area of potential concern. Therefore, the Navy considers that existing civil authority plans for responding to natural and industrial disasters are sufficient to deal with any highly unlikely event on a U.S. NPW. It is important to note that there are no U.S. NPW specific civil authority plans for public protective actions, such as sheltering, evacuation, or distribution of potassium iodide, in any U.S. port where NPWs are homeported or maintained since it is not required for public safety.