CHAPTER 18. PUBLIC HEALTH AND SAFETY

18.1 INTRODUCTION

This chapter contains a discussion of the potential environmental consequences associated with implementation of the alternatives within the region of influence for public health and safety. For a description of the affected environment for all resources, refer to the respective chapter of Volume 2 (Marine Corps Relocation – Guam). The locations described in that Volume include the region of influence for the aircraft carrier berthing component of the proposed action (Apra Harbor), and the chapters are presented in the same order as the resource areas contained in this Volume.

Under the proposed action for a transient aircraft carrier wharf, there would be a cumulative total of up to 63 visit days per year, with an anticipated length of 21 days or less per visit. To provide some additional background information on operational requirements of a nuclear powered aircraft carrier, a discussion of radiological substances is provided below for these types of vessels. Environmental consequences of the proposed action are discussed in Section 18.2.

18.1.1 Radiological Substances

The Final Environmental Impact Statement for the proposed homeporting of additional surface ships at Naval Station Mayport, FL (NAVFAC 2008) was used to supply background information regarding radiological concerns relative to nuclear powered warships.

Nuclear aircraft carriers that would visit Guam include Nimitz Class (CVN 68) and Ford Class (CVN 78) vessels. The source of energy for powering a Naval nuclear ship originates from fissioning uranium atoms within a reactor core. Pressurized water circulating through a closed primary piping system transfers heat from the reactor core to a secondary steam system isolated from the reactor cooling water. The heat energy is then converted to mechanical energy to propel the ship, and provides electrical power to the rest of the ship. Nuclear propulsion provides virtually unlimited high-speed endurance without dependence on tankers and their escorts.

18.1.1.1 Naval Nuclear Propulsion Program

The Naval Nuclear Propulsion Program (NNPP) regulates radioactivity associated with Naval nuclear propulsion work. The policies of the NNPP are applied consistently to all locations where nuclear powered ships are berthed or maintained. The NNPP is a joint Navy/Department of Energy (DOE) organization responsible for all matters pertaining to Naval nuclear propulsion pursuant to Presidential Executive Order (EO) 12344 and Public Law 98-525 (42 United States Code [USC] 7158).

Because radioactive material is an inherent by-product of the nuclear fission process, its control has been a central concern for the NNPP since its inception. All features of design, construction, operation, maintenance, and personnel selection, training, and qualification have been oriented toward minimizing environmental effects and ensuring the health and safety of workers, ships' crew members, and the public. Conservative reactor safety design has been a hallmark of the NNPP.

The history of safe operation of the Navy's nuclear powered ships is a matter of public record. This record shows a long history of the NNPP's activities having no adverse effect on the environment or public health. Environmental monitoring results published yearly provide a comprehensive description of environmental performance for all NNPP facilities. This record confirms that the procedures used by the

Navy to control radioactivity from United States (U.S.) Naval nuclear powered ships are effective in protecting the environment and the health and safety of Sailors, workers, and the general public.

NNPP reactor designs receive independent evaluations from the Nuclear Regulatory Commission and the Advisory Commission on Reactor Safeguards. These reviews are conducted as a means to provide confirmation and added assurance that nuclear propulsion plant design, operation, and maintenance pose no undue risk to public health and safety.

Key radiological control practices used by the NNPP to provide assurance that positive control of radioactivity is maintained include the following.

- A radioactive materials accountability system is used to ensure that no radioactive material is lost or misplaced.
- All radioactive materials are specially packaged, sealed, and tagged with yellow and magenta tags bearing the standard radiation symbol and the measured radiation level. The use of yellow packaging material is reserved solely for radioactive material.
- Access to radiological facilities is controlled by trained radiological control personnel. In addition, all personnel entering radiological work and storage areas are required to wear dosimetry devices.
- Only specially trained personnel are authorized to handle radioactive materials.
- Radiological surveys are conducted by qualified radiological control personnel inside and outside of facilities and ships where radiological materials are handled. This is a check to verify that the methods used to control radioactivity are effective.
- Written procedures are used to perform all radiological work.
- Radioactive material or radioactive waste transported off-site is packaged and shipped per Department of Transportation regulations. Specially trained personnel accomplish this function.
- Technical problems encountered during radiological work are documented and corrected before work is allowed to continue.

The safety record of U.S. Naval nuclear propulsion plants aboard nuclear powered warships is well known; there has never been a reactor accident in over 50 years since the first Naval reactor began operation, a record comprising over 5,900 reactor-years of experience. There has never been any release of radioactivity that has had an adverse effect on the public or the environment.

18.1.1.2 Emergency Preparedness

Naval reactors are designed and operated in a manner that is protective of the crew, the public, and the environment. All NNPP activities have plans 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 consistently demonstrate that NNPP personnel are well prepared to respond to emergencies regardless of the location. Actions are taken to continually evaluate and improve emergency preparedness at all NNPP activities.

If there ever were a radiological emergency, civil authorities would be promptly notified and kept fully informed of the situation. With the support of NNPP personnel, local civil authorities would determine appropriate public actions, if any, and communicate this information via their normal emergency communication methods.

Pursuant to Section 8506(7) of the Government Code of Guam, the Governor shall utilize the services and facilities of existing Government of Guam (GovGuam) agencies for the purposes of responding to all phases of any emergency or disaster. The Guam Emergency Response Plan outlines the procedures and responsibilities for responding to any emergency or disaster. The Plan incorporates the National Incident Management System of operation, which entails an organized response to emergency situations utilizing the services and resources of all GovGuam agencies. Each GovGuam agency has specific roles and responsibilities. Some would be primary responders or lead agencies, while others would provide support to the response effort lending manpower, staff resources, and supplies and equipment to meet the needs of the emergency. The Unified Command of all organizations addressing these functions would be located at the Emergency Operations Center at the Office of Civil Defense (GovGuam 2005).

Due to the unique design and operating conditions of U.S. nuclear powered ships, civil emergency response plans that are sufficient for protecting the public from industrial and natural events (e.g., chemical spills or typhoons) are also sufficient to protect the public in the unlikely event of an emergency onboard a nuclear powered ship. Response plans have been a part of the Guam emergency management planning for over 50 years as Navy nuclear power ships have traditionally been stationed in Inner Apra Harbor.

18.2 ENVIRONMENTAL CONSEQUENCES

18.2.1 Approach to Analysis

18.2.1.1 Methodology

Potential effects to public health and safety from implementation of the proposed aircraft carrier berthing alternatives were derived based upon information detailed in the descriptions of each alternative. Public health and safety concerns were addressed based on anticipated changes in the population of Guam, both from natural increases and from military personnel and their dependents moving to Guam. Average per capita incidents for notifiable diseases, mental illness, and traffic accidents were used to calculate the potential increase in these incidents as a result of the aircraft carrier berthing alternatives. Safety of construction workers would be the same as outlined in Volume 2. Proposed construction activities supporting aircraft carrier berthing activities would be conducted in accordance with federal and local safety guidelines to ensure a safe work environment.

With construction activities, there is a potential for standing water and water based vectors such as mosquitoes and related diseases. Most mosquitoes require quiet, standing water or moist soil where flooding occurs to lay their eggs. Removal of standing water sources and/or promotion of drainage would eliminate potential breeding sites. To limit the amount of standing water at construction sites, stagnant water pools, puddles, and ditches would be drained or filled; containers that catch/trap water (e.g., buckets, old tires, cans) would be removed; and if necessary, pesticide application (e.g., *Bacillus thuringensis*) could be used to help control mosquitoes. Implementing these best management practices (BMPs) would reduce the opportunities for an outbreak of water-related diseases.

Public health and safety concerns from proposed aircraft carrier berthing activities result primarily from ground disturbing and nearshore dredging activities. Public health and safety concerns to be addressed in this Volume are related to environmental/social safety (including noise, water quality, air quality, hazardous substances, health care services, and public services), unexploded ordnance (UXO), and radiological substances.

18.2.1.2 Determination of Significance

Factors considered in determining whether an alternative would have a significant public health and safety impact include the extent or degree to which implementation of the proposed aircraft carrier berthing alternatives would subject the public to an increased risk of contracting a disease or experiencing personal injury.

18.2.1.3 Issues Identified during Public Scoping Process

The following analysis focuses on possible effects to public health and safety that could result from the proposal. As part of the analysis, concerns related to public health and safety that were mentioned by the public, including regulatory stakeholders, during the public scoping meetings were addressed. The following public health and safety concerns were raised during public scoping meetings regarding the proposed relocation of military personnel and their families to Guam:

- Potential increases in diseases including:
- Acquired Immune Deficiency Syndrome (AIDS)
- Cholera
- Dengue
- Hepatitis C
- Malaria
- Measles
- Rubella
- Tuberculosis
- Typhoid Fever
- Sexually Transmitted Diseases (STDs) other than AIDS
- Potential increases in mental illness
- Potential increases in traffic incidents
- Potential contact with UXO

18.2.2 Alternative 1 Polaris Point (Preferred Alternative)

18.2.2.1 Environmental/Social Safety

Noise

Construction and operational noise emissions associated with aircraft carrier berthing is discussed in Volume 4, Chapter 6. Although pile driving activities would generate high noise levels at the source, the noise level at the nearest receptor is well within acceptable limits. Noise impacts due to the aircraft carrier berthing would be less than significant.

Water Quality

Construction and operational activities associated with aircraft carrier berthing activities would be implemented in accordance with SOPs and BMPs, and in accordance with applicable regulations. Therefore, impacts to water quality from construction and operational activities would be less than significant.

Air Quality

As discussed in Volume 4, Chapter 5, increased pollutants associated with construction and operational activities associated with aircraft carrier berthing would be less than significant. Although increased

emissions would be less than significant, construction and operational activities would result in a measured increase in pollutant emissions, which could result in health impacts to individuals on Guam. Air pollution can harm individuals when it accumulates in the air in high enough concentrations. People exposed to high enough levels of certain air pollutants may experience:

- Irritation of the eyes, nose, and throat
- Wheezing, coughing, chest tightness, and breathing difficulties
- Worsening of existing lung and heart problems
- Increased risk of heart attack

In addition, long-term exposure to air pollution can cause cancer and damage to the immune, neurological, reproductive, and respiratory systems. In extreme cases, it can even cause death.

Some groups of people are especially sensitive to common air pollutants such as particulates and ground-level ozone. Sensitive populations include children, older adults, people who are active outdoors, and people with heart or lung diseases, such as asthma (Massachusetts Department of Environmental Protection [MDEP] 2009).

It is anticipated that Guam clinics and hospital would increase staffing to meet current health care service ratios and would be capable of handling a potential increase in air quality-related illnesses; therefore, less than significant impacts would be anticipated as a result of increased emissions from construction and operational activities.

Hazardous Substances

Activities associated with aircraft carrier berthing would result in an increase in the use, handling, storage, transportation, and disposition of hazardous substances. These activities would be conducted in accordance with applicable hazardous material and waste regulations, and established BMPs and SOPs to ensure the health and safety of workers and the general public is maintained. BMPs and SOPs include:

- Implementing Hazardous Materials Management Plans
- Implementing Facility Response Plans
- Implementing Spill Prevention Control and Countermeasures plans (training, spill containment and control procedures, clean up, notifications, etc.) and ensuring personnel are trained in accordance with spill prevention, control, and cleanup methods
- Implementing hazardous materials minimization plans
- Ensuring DoD personnel are trained as to proper labeling, container, storage, staging, and transportation requirements for hazardous materials
- Ensuring that DRMO has sufficient hazardous materials storage, transportation, and disposal capacity prior to any expected increases
- Verifying full compliance with federal, local, and DoD laws and regulations and implement corrective actions as necessary

Because hazardous substance management activities would be conducted in accordance with applicable regulations and established BMPs and SOPs, no impacts to public health and safety are anticipated.

Health Care Services

Volume 4, Chapter 16 discusses the impact of an increased patient to health care provider ratio as a result of population growth associated with the aircraft carrier berthing. It is anticipated that short- and mid-term medical staffing requirements would increase over current requirements as a result of increased

population. During the peak construction year (2014) less than 1 additional doctor (<1% increase) and 3 additional nurses (<1% increase) would be required to maintain the current service ratios; the number of additional doctors would be less than 1 (<1% increase) and nurses drops to 1 (<1% increase) after construction activities are completed. These additional health care professionals would be hired in order to maintain current service ratios. Without corresponding increases in health care providers potential health and safety impacts could include:

- Longer wait/response times for patients
- Fewer or no available providers on island for chronic or acute issues
- Complications or death from delayed treatment, and/or
- Requirements for patients to travel off-island to receive adequate treatment

Because corresponding increases in doctors and nurses are anticipated to occur to maintain existing service conditions, no impact to health care services is anticipated.

Public Services

Police Service

Volume 4, Chapter 16 discusses staffing requirements for GPD necessary to cope with population increases associated with aircraft carrier berthing. It is anticipated that short- and mid-term GPD staffing requirements would increase over current requirements as a result of increased population. During the peak construction year (2014) the GPD would require 3 (<1% increase) additional officers to maintain the current service ratio; the number of additional officers drops to 1 (<1% increase) after construction activities are completed. The GPD would hire these additional personnel in order to maintain current service ratios. Without increases in police services (i.e., more police officers) to compensate for population increases, it would be expected that crime rates and police response times would also increase. As a result, the severity of consequences associated with crimes may worsen (i.e., there may be increased injury and or death associated with delayed police responses).

Because corresponding increases in GPD personnel are anticipated to occur to maintain existing service conditions, no impact to police service are anticipated.

Fire Service

Volume 4, Chapter 16 discusses staffing requirements for GFD necessary to cope with population increases associated with aircraft carrier berthing. It is anticipated that short- and mid-term GFD staffing requirements would increase over current requirements as a result of increased population. During the peak construction year (2014) the GFD would require 2 (<1% increase) additional firefighters to maintain the current service ratio; the number of additional firefighters drops to less than 1 (<1% increase) after construction activities are completed. The GFD would hire these additional personnel in order to maintain current service ratios. Without increases in fire protection services (i.e., more firemen, trucks and stations) to compensate for population increases, it is anticipated that response times to incidents would increase. As a result, increases in property damage and injuries/deaths could be expected.

Because corresponding increases in GFD personnel are anticipated to occur to maintain existing service conditions, no impact to fire service are anticipated.

18.2.2.2 Notifiable Diseases

Analysis of potential impacts from increased notifiable diseases is provided in Volume 2. Alternative 1 Polaris Point (referred to as Alternative 1) proposed aircraft carrier berthing activities would result in no impact to public health and safety from notifiable diseases.

18.2.2.3 Mental Illness

Analysis of potential impacts from increased mental illness is provided in Volume 2. Alternative 1 for proposed aircraft carrier berthing activities would result in no impact to public health and safety resulting from mental illness.

18.2.2.4 Traffic Incidents

Analysis of potential increases in traffic incidents is provided in Volume 2. Proposed aircraft carrier berthing activities are not anticipated to have an adverse effect on the health and safety of the citizens of Guam from traffic incidents.

The Navy has used focus group sessions with personnel at several bases to strategize potential measures to reduce the number of liberty incidents, including traffic incidents. Several common factors appear to contribute to liberty incidents including young personnel, late nights, impaired driving, and alcohol/drugs. Some of the measures that would be implemented to reduce traffic incidents during liberty include:

- Increase awareness training regarding the consequences of drugs and alcohol use
- Increase awareness and enforcement by military law enforcement personnel targeting operation of motor vehicles under the influence
- Use of the inter-service disciplinary control board for review of requests to declare specific off-base bars/clubs “off-limits” to military personnel
- Increase community policing efforts to include appropriate use of Shore Patrol activity to reduce alcohol related injuries
- Continued use of free shuttle bus runs to/from town
- Restrictions on obtaining rental of vehicles by age and command restrictions on rental of motorized two wheeled conveyances, would reduce potential safety and health concerns raised by transient personnel use of rentals

Therefore, Alternative 1 for proposed aircraft carrier berthing activities would result in no impact to public health and safety from traffic incidents.

18.2.2.5 UXO

The Island of Guam was an active battlefield during World War II. As a result of the invasion, occupation, and defense of the island by Japanese forces and the assault by Allied/American forces to retake the island, unexploded military munitions may still remain. On shore excavation and grading activities and dredging for wharf construction and establishing navigational channels and turning basins could encounter unexploded military munitions in the form of UXO, Discarded Military Munitions (DMM) and/or materials potentially presenting an explosive hazard. Exposure to these Munitions and Explosives of Concern (MEC) could result in the death or injury to workers or to the public. To reduce the potential hazards related to the exposure to MEC, a review of historical records and other information would be performed. If there is reason to believe MEC may be found in the area, qualified UXO personnel would perform surveys to identify and remove potential MEC items prior to the initiation of ground disturbing or dredging activities. Additional safety precautions would include UXO personnel supervision during earth moving and dredging activities, and providing MEC awareness training to

construction personnel involved in excavations and dredging prior to and during construction activities. The identification and removal of MEC prior to initiating construction activities and training construction personnel as to the hazards associated with unexploded military munitions would ensure that potential impacts would be minimized and would be less than significant.

Therefore, Alternative 1 for proposed aircraft carrier berthing activities would result in less than significant impacts to public health and safety from UXO.

18.2.2.6 Radiological Substances

As of July 2007, U.S. Naval reactors have accumulated over 5,900 reactor-years of operation and have steamed over 137 million miles (mi) (220 million kilometers [km]) and there has never been a reactor accident, nor any release of radioactivity that has had an adverse effect on human health or the quality of the environment.

Because naval reactors must fit aboard a warship, they are smaller and have a much lower power rating than commercial reactors. Also, because reactor power is directly linked to propulsion requirements, naval reactors typically operate at low power or shut down entirely when the warship is in port. In the event of a nuclear reactor emergency, the ship can be rigged and towed away from populated areas, which is not the case for a land-based reactor.

Nearly all (99%) of the radioactive atoms in a nuclear reactor are found in two forms: 1) the uranium fuel itself or 2) fission products created by the nuclear chain reaction. The remaining radioactive atoms present in a Naval nuclear reactor are encountered in two forms. The majority of the remaining radioactive atoms (99.9% of the remaining 1%) are part of the metal of the reactor plant piping and components. The balance (0.1% of the remaining 1%) is in the form of radioactive corrosion and wear products originating from metal surfaces in contact with reactor coolant.

Corrosion and wear products in Naval nuclear reactor plants include the following radionuclides with half-lives of about 1 day or greater: tungsten-187, chromium-51, hafnium-181, iron-59, iron-55, nickel-63, niobium-95, zirconium-95, tantalum-182, manganese-54, cobalt-58, and cobalt-60. The predominant radionuclide is cobalt-60 that has a 5.2 year half-life and emits gamma radiation that is one of the most penetrating forms of radiation. Cobalt-60 also has the most restrictive concentration limit in water as listed by organizations that set radiological standards for these corrosion and wear radionuclides. Therefore, cobalt-60 is the primary radionuclide of interest for Naval nuclear propulsion plants.

Radiological Environmental Monitoring Program

To provide additional assurance that procedures used by the Navy to control radioactivity are adequate to protect the environment, the Navy conducts environmental monitoring in harbors frequented by its nuclear powered ships. Samples from each harbor monitored are also checked at least annually by a DOE laboratory to provide a further check on the quality of the environmental sample analyses as a check of Navy results. The DOE laboratory findings have been consistent with those of the Navy.

Marine monitoring consists of analyzing harbor water, sediment, and marine life for radioactivity associated with Naval nuclear propulsion plants. This monitoring is supplemented by shoreline surveys. Sampling harbor water and sediment on a quarterly basis is emphasized since these materials would be the most likely to be affected by releases of radioactivity.

Sediment samples are collected and analyzed specifically for the presence of cobalt-60, which is the predominant radionuclide of environmental interest resulting from Naval nuclear reactor operation. Surveys for cobalt-60 sampling in 2006 show that most harbors do not have detectable levels of cobalt-60

in sediment. Low levels of cobalt-60, less than three millionths of a microcurie per gram, were detected around a few operating base and shipyard piers where nuclear powered ship maintenance and overhauls were conducted in the early 1960s. These low levels were well below the naturally occurring radioactivity levels in these harbors. Since 1970, nuclear powered warship operations have not caused any increase in the general background radioactivity in the environment.

Harbor water is also sampled each quarter in areas where nuclear powered ships are berthed, and from upstream and downstream locations. No cobalt-60 has been detected in any of the water samples from the harbors monitored.

Marine-life samples, such as mollusks, crustaceans, and plants have been taken from harbors monitored. No buildup of cobalt-60 has been detected in these samples of marine life. Shoreline areas uncovered at low tide are surveyed to determine if any radioactivity from bottom sediment has washed ashore. The results of these surveys are consistent with natural background radiation levels in these regions. Thus, there is no evidence that these areas are being affected by nuclear powered ship operation.

Results of Environmental Monitoring

The Navy issues an annual report that describes the Navy's policies and practices regarding such issues as disposal of radioactive liquid, transportation and disposal of radioactive materials and solid wastes, and monitoring of the environment to determine the effect of nuclear powered warship operation. This report is provided to Congress and to cognizant federal, state, and local officials in areas frequented by nuclear powered ships. This report shows that the total amount of long-lived gamma radioactivity released into harbors and seas within 12 mi (19 km) of shore has been less than 0.002 curies during each of the last 36 years.

Nuclear Regulatory Commission regulation (10 Code of Federal Regulations [CFR] 20) lists water concentration limits for discharge of radioactivity in effluents. These limits are based on limiting the dose to members of the public from continuous ingestion of the activity discharged to 50 millirem per year. The control of radioactive liquid discharges at Navy facilities is much more stringent than at facilities that comply with the limits of 10 CFR 20, such as commercial nuclear power plants. The total combined radioactivity discharged from all Navy nuclear powered vessels annually within 12 mi (19 km) of shore is less than one hundredth of the amount of radioactivity released by one typical commercial nuclear power plant.

As a measure of the significance of this data, if an individual were able to drink the entire amount of radioactivity discharged into any harbor in any of the last 36 years by U.S. nuclear powered warships, that person would not exceed the annual radiation exposure permitted for an individual worker by the Nuclear Regulatory Commission.

Emergency Planning

Naval reactors are designed and operated in a manner that is protective of the crew, the public, and the environment. NNPP activities have plans in place that define NNPP responses to a wide range of emergency situations. If there ever were a radiological emergency, civil authorities would be promptly notified and kept fully informed of the situation. With the support of NNPP personnel, local civil authorities would determine appropriate public actions, if any, and communicate this information via their normal emergency communication methods as outlined in the Guam Emergency Response Plan (GovGuam 2005).

Due to the unique design and operating conditions of U.S. nuclear powered ships, civil emergency response plans that are sufficient for protecting the public from industrial and natural events (e.g., chemical spills or typhoons) are also sufficient to protect the public in the unlikely event of an emergency onboard a nuclear powered ship.

Incident Response

Although the risk of a radiological incident of significant consequence is small, emergency plans are in place at all Naval nuclear facilities to minimize the impacts of an emergency. These plans include activation of emergency control organizations throughout the NNPP to provide on-scene response as well as support for the on-scene response team. Realistic training exercises are conducted periodically to ensure that the response organizations maintain a high level of readiness and to ensure that coordination and communication lines with local authorities and other federal and state agencies are effective. Emergency response measures include provisions for immediate response to any emergency at any naval site, identification of the accident conditions, and communication with civil authorities providing radiological data and recommendations for any appropriate protective action. In the event of an incident involving radioactive or mixed-waste materials, workers in the vicinity of the incident would promptly seek shelter to minimize exposure and aid in emergency response consistent with the site's emergency plan for responding to fires and hazardous material incidents. This typically occurs within minutes of the incident and reduces the hazard to workers.

While the Navy would recommend appropriate actions to protect the public if needed based on federal guidance (EPA 400-R-92-001), local officials would be responsible for determining and implementing protective actions for the general public outside of the Naval base. In the highly unlikely event that some radioactivity escapes from the Naval base, the radioactivity would still only affect areas close to the release, and the exposure to the public would be localized and not severe. As such the need for local officials to take protective actions is extremely low. However, in the unlikely event that some action were necessary, existing civil emergency response plans in place for handling industrial and natural events (e.g., chemical spills or typhoons) are more than sufficient to protect the public in response to a radiological emergency originating from a Naval base.

Upon notification that an emergency exists, the Administrator of the Office of Civil Defense would activate the emergency response system outlined in the Guam Emergency Response Plan. The Administrator would notify and instruct all GovGuam agency heads and acting on behalf of the Governor of Guam, mobilize all response activities necessary. The National Incident Management System would be initiated to respond to all emergencies. In the event that the capability and resources of GovGuam become inadequate to effectively cope with an emergency, the Governor would request supplemental assistance from the federal government or activate the Emergency Management Assistance Compact.

The record of the NNPP's environmental and radiological performance at operating bases and shipyards presently used by nuclear powered warships demonstrates the continued effectiveness of this management philosophy. Through the entire history of the NNPP, the Navy has logged over 5,900 reactor years of operation and more than 137 million mi (220 million km) steamed on nuclear power with no reactor accidents or any release of radioactivity that has had an adverse effect on human health or the quality of the environment. Therefore, Alternative 1 for proposed aircraft carrier berthing activities would result in no impact to public health and safety from radiological substances.

18.2.2.7 Summary of Alternative 1 Impacts

Table 18.2-1 summarizes Alternative 1 impacts.

Table 18.2-1. Summary of Alternative 1 Impacts

Area	*Project Activities*	*Project Specific Impacts*
Onshore	Construction	Less than significant impacts due to noise and air quality No impacts to public health and safety from water quality, hazardous substances, health care services, public safety services, notifiable diseases, mental illness, traffic incidents, UXO, or radiological substances
	Operation	Less than significant impacts due to noise and air quality No impacts to public health and safety from water quality, hazardous substances, health care services, public safety services, notifiable diseases, mental illness, traffic incidents, UXO, or radiological substances

18.2.2.8 Alternative 1 Potential Mitigation Measures

No mitigation measures would be required.

18.2.3 Alternative 2 Former Ship Repair Facility (SRF)

Potential impacts to public health and safety (i.e., disease, mental illness, traffic incidents, UXO, and radiological sources) from implementation of aircraft carrier berthing activities would be the same as those discussed under Alternative 1. Alternative 2 Former SRF (referred to as Alternative 2) for proposed aircraft carrier berthing activities would result in no impact to public health and safety.

18.2.3.1 Summary of Alternative 2 Impacts

Table 18.2-2 summarizes Alternative 2 impacts.

Table 18.2-2. Summary of Alternative 2 Impacts

Area	*Project Activities*	*Project Specific Impacts*
Onshore	Construction	Less than significant impacts due to noise and air quality No impacts to public health and safety from water quality, hazardous substances, health care services, public safety services, notifiable diseases, mental illness, traffic incidents, UXO, or radiological substances
	Operation	Less than significant impacts due to noise and air quality No impacts to public health and safety from water quality, hazardous substances, health care services, public safety services, notifiable diseases, mental illness, traffic incidents, UXO, or radiological substances

18.2.3.2 Alternative 2 Potential Mitigation Measures

No mitigation measures would be required.

18.2.4 No-Action Alternative

Analysis of potential impacts to public health and safety from implementation of the no-action alternative is provided in Volume 2. No impact to the health and safety of the citizens of Guam resulting from implementing the no-action alternative is anticipated.

18.2.5 Summary of Impacts

Table 18.2-3 summarizes the potential impacts of each action alternative and the no-action alternative. A text summary is provided below.

Table 18.2-3. Summary of Impacts

Potentially Impacted Resource	*Alternative 1*	*Alternative 2*	*No-Action Alternative*
Environmental/Social Safety	LSI	LSI	NI
Notifiable Diseases	NI	NI	NI
Mental Illness	NI	NI	NI
Traffic Incidents	NI	NI	NI
UXO	LSI	LSI	NI
Radiological Substances	NI	NI	NI

Legend: SI = Significant impact, SI-M = Significant impact mitigable to less than significant, LSI = Less than significant impact, NI = No impact, BI = Beneficial impact

The potential increase in noise and air quality emissions would be less than significant; therefore, overall potential impacts to human health and safety would be less than significant. Corresponding increases in health care professionals, GPD, and GFD personnel are anticipated to occur to maintain existing service conditions; therefore, no impact to health care, police, or fire service is anticipated. No impact to public health and safety are anticipated from water quality concerns and management of hazardous substances.

The potential increases in disease occurrences and mental illness as a result of proposed aircraft carrier berthing activities are low and not likely to impact the resources of the citizens of Guam. The potential increase in the number of traffic accidents and fatalities would also be minimal and no adverse impact on the health and safety of the citizens of Guam from traffic incidents is anticipated.

Onshore excavation and grading activities and dredging for wharf construction and establishing navigational channels and turning basins could encounter unexploded military munitions. To reduce the potential hazards related to the exposure to MEC, a review of historical records and other information would be performed. If there is reason to believe MEC may be found in the area, qualified UXO personnel would perform surveys to identify and remove potential MEC items prior to the initiation of ground disturbing or dredging activities. Additional safety precautions would include UXO personnel supervision during earth moving and dredging activities, and providing MEC awareness training to construction personnel involved in excavations and dredging prior to and during construction activities. The identification and removal of MEC prior to initiating construction activities and training construction personnel as to the hazards associated with unexploded military munitions would ensure that potential impacts would be minimized and would be less than significant.

The risk of a radiological incident of significant consequence is small and emergency plans would be in place to minimize the impacts of an emergency. The Navy has not experienced a reactor accident or any release of radioactivity that has had an adverse effect on human health or the quality of the environment; therefore, no impact to public health and safety from radiological substances is anticipated.

18.2.6 Summary of Potential Mitigation Measures

No potential mitigation measures have been identified or would be required for either alternative.