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**Maintaining Infinite Readiness for War:
Environmental Wreckage and Human Misery**

Tricia Bell

**A Thesis
in
The Department
of
Communication Studies**

**Presented in Partial Fulfillment of the Requirements
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ABSTRACT

Maintaining Infinite Readiness for War: Environmental Wreckage and Human Misery

Tricia Bell

This thesis combines a study of case examples and theories of war to help illuminate the magnitude of environmental ruin and negative human impact of maintaining an infinite readiness for domination in war. I draw from a body of literature on theories of war to exemplify two major concepts: first, that the reach of the military into our everyday (civil) lives has blurred the boundaries of concepts like military and civil or war and peace; and second, that we are experiencing an intensification of destructive forces. I present evidence of the charge that the military is the worst environmental vandal worldwide, and yet can evade public scrutiny and legal liability. I also challenge the logic of pursuing military prowess to ‘deter’ the ‘enemy’ or ‘protect’ ‘national security’ by examining two specific examples, nuclear testing in the Marshall Islands and chemical warfare production at Rocky Mountain Arsenal. Finally, I assert that infinite war-readiness, or ‘peace-fare’, is a distinct historical marker in contemporary war and I highlight some of the factors influencing its evolution. An analysis of the lethality of ‘peace-fare’ military missions demands immediate attention because of the irrevocable environmental damage and potential for mutual annihilation that accompanies its pursuit. The time to oppose infinite militarization is now because it can only offer us insecurity, devastation, death, and potentially planetary annihilation.

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Introduction

For millennia we have endured the afflictions of war and its aftermath while contemplating its inevitability as somehow part of the human condition. The question regarding the inevitability of war remains unanswered and perhaps is losing significance as we perfect warfare capable of planetary annihilation. The question of increasing importance seems to be whether humans will rally against a cosmology based on conquest, violence, and domination before the bluff of planetary annihilation is finally called. My interest in the war-machine stems from the following suggestion that Paul Virilio made: “within this perversion of knowledge by the war machine, hides its opposite” (Virilio, 1983; 1997: 107).

The military’s assault against the ecosystem spans both war preparations and the eruption of wars. History is replete with examples of warfare that illustrate intense devastation. Moreover, the environmental impact of war has grown as technology has become more sophisticated through boosted firepower, range, and speed of weapons. Despite the significant environmental ruin attributable to declared wars, I have chosen to focus solely on ‘peace-fare’ environmental ruin because unlike warfare there is no desire or effort to end the assault.

I have chosen to interrogate the activities of the U.S. military because they are responsible for the preponderance of global military activities and the accompanying appalling amounts of unrelenting, lethal pollution. I assert that U.S. military officials are not able to reconcile that they are polluting large tracts of land, the atmosphere, water sources and inevitably poisoning all life in their efforts to ‘protect’ through ‘peace-fare’,

or infinite readiness for war. I will demonstrate that 'peace-fare', as opposed to a 'foreign enemy', poses the greatest threat to human and ecological security since it has intensely depleted precious societal resources and generated mountains of lethal contaminants. The gravity associated with military pollutants is most obvious and terrifying in the areas that have been deemed 'sacrifice zones'. Military 'peace-fare' missions create intense lethal contamination from chemical, biological, nuclear weapons production and testing, but some areas have been contaminated beyond rehabilitation. The land that is inflicted with irrevocable environmental damage is simply to be 'sacrificed' according to the military. This means that the area must remain uninhabited for generations to come. While the military charges forward with its 'peace-time' missions we are left wondering how much of our planet we will have to surrender for 'sacrifice'.

I also suggest that a clear demarcation between war and peace is no longer evident as the logistics of infinite war-readiness militarize all aspects of our lives. The institutionalization of permanent war-readiness has enlisted civilian involvement in the war economy to an unprecedented degree. Yet, the direct and indirect costs associated with a permanent warfare state are either counted as profit or externalized to those who profit the least. The constant mobilization for war enlists civilians in its perpetuation, while the toxic contamination resulting from infinite war-readiness assaults the ecosystem and all life. Therefore I have suggested that 'peace-time' military activity is more accurately described as Wars of Deterrence.

My position in this research is that I am appalled by the magnitude of military toxics that plague the earth, and I am also disturbed by the infinite pursuit of

militarization with such little regard for the irrevocable environmental damage caused. I feel that it is important to expose aspects of military activity that help to point to the enormity of problems that we face and will face for many generations. In addition, I believe that we all have a social responsibility to rally against the corruptive forces in our society that collude and conspire to perpetuate profit through the war-machine. My bias is in favor of activists struggling against military toxics in their communities because they offer the only solutions to eradicate the violent stranglehold militarism places on our society.

I begin this thesis in an effort to exemplify two major concepts: first, that the reach of the military into our everyday (civil) lives blurs the boundaries of concepts like military and civil and war and peace, and second, that we are experiencing an intensification of destructive forces. I suggest that this has occurred due to the intense resource depletion and environmental wreckage, which are inherent features of 'peace-fare' missions. I chose two examples, the Marshall Islands and Rocky Mountain Arsenal, to substantiate this suggestion. Each region has a multitude of sites to highlight the lingering devastation, which 'peace-fare' leaves behind, and I focus on the most intensely devastated areas. I finish with a reflection on contemporary war. I highlight the direct, indirect, and externalized costs associated with the U.S. permanent war economy supported by a military-industrial complex. Although I focus mainly on the United States' 'peace-fare' missions, the national scene is not completely inextricable from the international arena, and inevitably my analysis filters through both.

My analysis in the first three chapters emerges from a cross-section of government and military documents, secondary sources, and primary sources published

by grassroots activist groups. I have compiled my writing about the military's responsibility for intense resource depletion and environmental ruin according to the U.S. military's own account of their 'peace-time' missions, regulatory agencies reports about their activities, and community groups which are also monitoring and challenging infinite militarization. In chapter four I utilize the ideas of various theorists to bolster my suggestions. C. Wright Mills, Paul Virilio, Manuel De Landa, Chris Cuomo, and Robin Schott assert that there is no longer a lack of clear demarcation between war and peace or military and civil. Marilyn Waring, Ulrich Beck, Gregory Bischak, and Sidney Lens challenge notions of 'security' premised on military peril, and expose the invisible costs associated with 'peace-fare' pursuits. My analysis begins by providing concrete information about military 'peace-time' activity and concludes by situating this information into contemporary theories of war and peace.

My first chapter outlines the lethality associated with war-readiness or 'peace-fare'. The extent of the U.S. military's 'peace-time' assault is astounding as the consumption needs of a well-oiled military machine that is tirelessly ready for war are infinite. The military consumes intense amounts of societal resources and in the process generates mountains of lethal waste. It is well documented that all militaries throughout the world wreak intense environmental havoc while maintaining a readiness for domination in war. The world's armed forces have been identified as the single largest polluter on earth; it also follows that the U.S. military is the nation's largest polluter. Military toxics range in degree and are either industrial-like pollutants or unique noxious substances.

Military sites are not only the most toxic sites on earth but these areas are also the least regulated. Regulatory agencies, like the Environmental Protection Agency and the General Accounting Office, monitor 'peace-fare' activities while trying to press the military for more openness, accountability, and environmental responsibility. Yet, their ability to achieve these goals is consistently constrained by military immunity from legal consequences or independent assessment and regulation. Grassroots activist organizations and community groups resisting militarization provide the most extensive and critical assessment of U.S. military 'peace-fare' missions and at the same time offer the necessary solutions to begin to eradicate militarization and establish the environmental restoration necessary for human and ecological security.

The Pentagon reassures the American public that the military is working towards environmental stewardship and waste reduction while they continue to hold a privileged position of self-regulation and immunity from environmental laws. It is most likely that Pentagon reassurances have been prompted to appease the intense pressure generated by communities which have to live amidst the military's lethal toxic legacy. Despite intense secrecy and continued classification of many military activities there is a surprising amount of information and admissions about the lethality of their 'peace-time' missions. Bureaucracy presents problems of delay and extreme cost to research and accumulate military and government publications, while grassroots publications are inexpensive and easy to access. For example, a document published by the U.S. military cost \$115 and took months to receive while a document of similar size from Military Toxics Project was \$25 and took one week to receive. The U.S. military publishes a plethora of information about the toxic nightmares facing the nation, yet maintains that the pollutants generated

fall within 'acceptable' limits and that their activities are necessary to maintain 'national security'. U.S. military publications also bury their admissions of environmental ruin in a mountain of information about their so-called 'milestone efforts' to alleviate environmental wreckage.

There are tens of thousands of sites just in the United States, and most likely hundreds of thousands of sites worldwide, which have been identified as priorities for environmental restoration given the magnitude of toxic contamination resulting from 'peace-time' military missions. The following two chapters provide detail about two areas, the Marshall Islands and Rocky Mountain Arsenal. These are both important sites to examine because each contains areas which have been irrevocably scarred by U.S. 'peace-fare' missions, and both stand as tragic symbols of the many other regions scarred by U.S. 'peace-fare' missions. The purpose of analyzing 'peace-fare' missions in the Marshall Islands is manifold. This region reveals some aspects of the global nature of U.S. 'peace-fare', and exemplifies the land that has been sacrificed in the infinite preparation for war. It also exposes the environmental racism intrinsic to military missions since indigenous populations in the Marshall Islands have not only been caught in the crossfire of 'peace-fare', but have been directly targeted. Finally, this region illustrates that war and peace can no longer be clearly demarcated. The reported sixty-seven nuclear bombs detonated in the Marshall Islands by the U.S. military during 'peace' have produced a horrifying legacy of forced migration, decimated local culture and subsistence living, and poisoned indigenous populations with radioactive byproducts and fallout. The concept of 'peace' is not only illusive, but arguably obsolete for the

Marshall Islanders who have suffered from what should only be referred to as the Nuclear Test War.

The supremacy and grip of the U.S. military is so great that they are capable of poisoning not only their own citizens, but people throughout the world. I explore two facets of the global nature of militarization; first that a foreign nation, like the U.S., poisons and decimates cultural groups and their ecosystem outside their national boundaries, and second that the lethal pollutants generated from 'peace-fare' missions cannot be neatly contained in the region they were generated. The Marshall Islands illustrate the global nature of militarized environmental destruction since it has been both a favorite dumping and testing ground for military forces worldwide including the U.S. My analysis will focus only on the U.S. military's 'peace-time' atomic testing in the region since World War II (WWII), but the issue of toxic and radioactive dumping in the region is significant and continues to be as militarized countries, like Britain, Germany, France, Russia, and the U.S., search for solutions to the relentless noxious waste generated by their armed forces.

'Peace' achieved through the infinite preparation for war has actually entailed nuclear war for the Marshall Islanders, yet not once has this war been officially declared. The Marshall Islands is representative of the entire Pacific region which has been a favored nuclear testing ground for the major military powers worldwide since the inception of nuclear weaponry. The Pacific has been militarized by U.S., Russian, French and British military forces to establish their presence in this strategic crossroad and compete for world domination. The pursuit of military prowess has not only been at the expense of indigenous people and their ancestral homeland, but both have been

directly targeted in U.S. Wars of Deterrence. I trace and recount some of the appalling and devastating human and ecological impact from U.S. 'peace-time' missions since the end of World War II for the Marshall Islanders because I would like to echo the words of Pacific women who ask: Why haven't you known?

The purpose of examining the 'peace-fare' missions at Rocky Mountain Arsenal (RMA) just outside of Denver, Colorado in the U.S. is also manifold and some aspects parallel the Marshall Islands. This region illustrates that the external 'enemy' poses less of a threat than the internal 'protector' does. The justification for 'national security' is inverted upon examination of the lingering wreckage at RMA and the resulting insecurity felt by those who reside near the site. The communities surrounding the former military installation have been struggling to cope with the environmental ruin and accompanying health complications due to decades of lethal chemical, pesticide, and herbicide production. RMA exemplifies the constant war-like assault that U.S. citizens must endure because of military 'peace-fare' activity that will continue to infinity, or perhaps more realistically self-exhaustion.¹ Finally, although this military site ceased its 'peace-fare' activities in 1987 the contamination not only lingers, but inevitably migrates through the atmosphere, soil, and water while the only viable solution for some areas has been 'sacrifice', or in other words a prohibition on habitation for unknown generations to come.

1. The claim of 'environmental racism' is further substantiated through an examination 'peace-fare' missions at Rocky Mountain Arsenal because the low-income mobile housing community of Irondale has borne the greatest burden and received the least attention thus far. See Robert Bullard, "Anatomy of Environmental Racism and the Environmental Justice Movement," John S. Dryzek and David Schlosberg, *Debating the Earth: The Environmental Politics Reader* (New York: Oxford University Press, 1998), 471-492.

I provide detail of the ecological nightmare at the site of Rocky Mountain Arsenal because I view it as a tragic symbol of the nearly 28,000 military sites reported by the Department of Defense as toxic ‘problems’ in the United States. It follows that assessing not only the extent of environmental wreckage, but also the potential to reverse it, is a monumental task that simply may not be possible for our future generations. RMA is simply one site of tens of thousands that exposes the paradox inherent to the U.S. military’s claim of ‘security’ against an external ‘enemy’. Military ‘protection’ has subjected local communities surrounding the Arsenal to a war-like assault by their ‘protectors’ for decades. Some of the environmental damage attributable to ‘peace-fare’ activities at RMA is irrevocable and continues its assault as it lingers and migrates through the soil, atmosphere, water systems, contaminating all life that depends on it. The military cannot resolve the paradox associated with ‘peace-time’ readiness to deter ‘foreign threats’. The unresolved paradox lies in the fact that their domestic population suffers more directly and forcefully from the relentless pursuit of war preparations.

In the final chapter I synthesize some aspects of the infinite pursuit of destructive warfare technology, or ‘peace-fare’, to highlight its historical significance. Contemporary war is distinct from previous eras in the pursuit of infinite war-readiness. My analysis is mainly focused on developments after World War II beginning with the shift in the U.S.’s strategic posture from ‘defense’ to ‘national security’. Although I provide some detail about two interrelated pre-WWII developments, the militaristic drive for resource acquisition and the emergence of ‘peace-time’ logistics. I recount some aspects related to the emergence of a permanent warfare economy and the military-industrial complex since both were integral to the formation of a ‘national security state’.

I highlight the economic and externalized social costs associated with the maintenance of a permanent warfare state. I assert that the corruption of institutionalized profiteering from mass violence and environmental wreckage presents a formidable obstacle to notions of security and peace. My approach was not focused on the developments related to scientific and technological mastery of destructive forces since WWII, but my suggestion that militarism has infused scientific research and development and technology with a violent determinacy resonates throughout this section.

I also explore Ulrich Beck's suggestion that the infinite pursuit of chemical, biological, and nuclear technology for destructive ends has obliterated our conceptions of the risks and threats associated with such pursuits. We do not have the capability to manage, yet alone restore, some of the environmental wreckage from military 'peace-fare'. Moreover, we cannot counter the reality that some of the effects are not simply limited to current life but will have a negative impact on future reproduction. My aim is to demonstrate that five decades of promoting 'national security' through military 'peace-fare' exemplifies that 'national security' stands in opposition to human and ecological security. A warfare state pauperizes its society, but also directly assaults its citizens and ecosystem as conceived boundaries and notions of foreign enemies are obliterated. The real enemy lies within the pursuit of infinite military prowess.

Yet, communities continue to be targeted for military 'peace-fare' missions and it is apparent that certain people on earth are more expendable than others. The burden of this war-like assault has been directed at low-income communities, indigenous communities, and people of colour. Thousands of sites around the U.S. and the world continue to be inflicted with military contamination. Yet, the U.S. military specifically

targets disempowered communities for 'peace-fare' exploits because they know that these communities can be divided about the potential income opportunities and will have less clout politically to resist the militarization of their communities. Although I do not expand on the health complications and risks facing soldiers, veterans, and private military contractors it is well documented that these groups also bear a disproportionate burden of the military's 'peace-time' assault. I suggest that we must stand in solidarity with communities and people who suffer the greatest burden of military toxics, and find a way to oppose military 'peace-fare' activity to ensure that the burden of military contamination is obliterated.

Throughout my exploration I suggest that an infinite preparation for war to 'deter' one's 'enemy' marks an important historical moment. The importance lies in the reality that 'peace-fare' is so lethal we have become our own worst enemy. Through my analysis it will become apparent that a never-ending pursuit of intensely destructive killing machines, chemicals, and bacteria to 'protect' the nation is contributing to its demise. The logic of 'protection' and 'security' promoted through military prowess raises an unresolved paradox. After five decades of sustaining a U.S. 'national security state' by harnessing the nation's resources for war-readiness and stimulating the economy through military spending, we have learned the consequence is an unrelenting war-like assault against the ecosystem and all its life. Notions of 'security' need to be re-configured in opposition to infinite militarization before we exterminate ourselves. Infinite militarization can only offer insecurity, devastation, and death. The next era of battles should be waged against the militaristic patterns and institutions that have infected our lives with the pursuit of planetary annihilation.

Chapter 1: Cold War Casualties

“Contrary to the opinion of many, the greater the military force of a nation, the greater the danger to that nation” (Hopi Elder quoted in Thomas, 1995: 151-152).

All militaries, worldwide, wreak environmental havoc during times of ‘peace’, where their mission is to maintain a readiness for domination in war. The world’s armed forces have been identified as the single largest polluter on earth (Finger, 1994). Military sites are the most toxic, dangerous, and least regulated sites on earth (Seager, 1999; Shulman, 1992; Bertell, 1985). U.S. ‘peace-time’ missions have entailed the pursuit, development, and testing of the most destructive high-tech weapons on domestic and foreign territory. The Department of Defense (DOD) and the Department of Energy (DOE) have not fully documented the extent of the pollution problems from their ‘peace-fare’ missions at current and former military installations throughout the U.S. Yet, the lethality of U.S. ‘peace-fare’ missions is most obvious in the ‘national sacrifice zones’. These areas have been polluted to such an extent that the damage is irrevocable, and the solution offered by the military is simply to fence off the area and declare it a ‘sacrifice’. It is deeply problematic that the military’s daily operations remain beyond the reach of civil law, and protected from independent public scrutiny. Yet, the Pentagon continues to use its political force to press for exemption from environmental, worker protection, and public safety laws (MTP & Environmental Health Coalition, 2001).

The purpose of what follows is to point to the magnitude of resource depletion and environmental wreckage that is inherent in a war-readiness posture. My focus here is mainly on the United States and their domestic ‘peace-time’ missions. Although I also make reference to aggregate information available about the impact of armed forces worldwide to highlight the global aspects of environmental wreckage and civilian assault.

I begin by providing some detail about the vast amount of resources consumed during ‘peace-time’ military missions. My focus is on the amounts of energy and minerals, but also the land and air, which the military commands for its ‘peace-time’ missions. My analysis then shifts to the colossal toxic waste that the U.S. military generates during times of ‘peace’. I provide a broad overview of the types and estimated amounts of military toxics before moving into a specific analysis of nuclear and chemical waste in the U.S. I move on to highlight that the Pentagon has not been able to completely deny the lethal implications of ‘peace-fare’ and has responded to public concerns about lingering toxics in their soils, water systems, and atmosphere by establishing an ‘environmental restoration program’. Despite some willingness to address the negative implications of their ‘war games’, the U.S. military is not willing to spend money required to truly restore the environment in some areas. Moreover, they continue to hold a privileged status of self-regulation and exemption from environmental laws. I will demonstrate in this chapter that ‘peace-time’ military development, production, testing, deployment, and demilitarization of conventional, biological, chemical, and nuclear weapons are more accurately conceptualized as Wars of Deterrence.

Permanent war-readiness involves substantial resource depletion and significant ecological destruction. Although precise and complete knowledge about the amounts of energy, minerals, and other materials consumed by the military is absent, there is enough information available to provide insight into the consumption needs of a well-oiled military machine that is tirelessly ready for war. The United States is the country that is most forthcoming about its military activities because of intense public pressure since the end of WWII, yet they still retain the privilege of withholding and classifying information

for 'national security' reasons. In addition, their own record keeping has been charged as negligent if not delinquent (Seigel et al., 1991). It is estimated that petroleum products account for almost three-quarters of all energy used by armed forces worldwide (Renner, 1991). The U.S. Pentagon is the largest domestic consumer of oil, and nearly 85 percent of the total energy used by the U.S. government is for military purposes (Biswas, 2000).² It should be noted that the proportion of oil and energy used by the military in some sectors rises drastically. For example, the military consumes an estimated 25 percent of jet fuel worldwide, or 42 million tons each year, and the U.S. Department of Defense admits to consuming at least 37 million tons of oil each year (Sidel, 2000; Renner, 1993; Finger, 1991).

The amount of energy required to manufacture weapons in the U.S. is estimated at twice the amount of their direct energy consumptive needs, yet is loosely referred to as indirect consumption and rarely quantified (Biswas, 2000; Renner, 1993). Military impact on non-fuel minerals is also staggering, with iron and steel constituting the "backbones of the military machine" (Renner, 1991: 140). Nine percent of all iron and steel, or roughly 60 million tons, utilized on our planet are consumed by the military, while militaries consume more aluminum, copper, nickel, platinum than all 'developing' nations combined (Biswas, 2000).³ The Pentagon also consumes between five and forty

2. The magnitude of energy consumption for military purposes is evident when one considers that the Pentagon uses enough energy in one year to run all of the U.S. mass transit system for approximately twenty-two years. See Victor W. Sidel, "The Impact of Military Preparedness and Militarism," Jay E. Austin and Carl E. Bunch, *The Environmental Consequences of War: Legal, Economic, and Scientific Perspectives* (Cambridge, Cambridge University Press: 2000), 441.

3. The magnitude of resources required for the infinite pursuit of military dominance is evident when we consider that the construction and deployment of only one land-based mobile intercontinental missile requires 4,450 tons of steel, 1,200 tons of cement, 50 tons of aluminum, 12.5 tons of chromium, 750 kilograms of titanium, and 120 kilograms of beryllium. See Michael Renner, "Assessing the Military's War on the Environment," Lester Brown et al., *State of the World 1991* (New York: W.W. Norton and Co., 1991), 140.

percent of non-fuel minerals such as beryllium, cobalt, germanium, thorium, thallium, and titanium in its pursuit to be the leading producer of sophisticated, high-tech destructive power (Finger, 1991; Renner, 1991).

Armed forces also require large expanses of land and airspace for the infinite pursuit of military preparedness (Bertell, 2001; Finger, 1991). The age of deterrence has entailed a phenomenal growth in arsenals and the amount of space required to maneuver fighter jets, more powerful tanks, massive aircraft carriers, submarines, as well as sites to test munitions (Lanier-Graham, 1993). Seth Shulman notes that “the Pentagon ranks among the nation’s largest landholders, with jurisdiction over some 27 million acres in the United States” (Shulman, 1992: 121). The Department of Defense directly holds 100,000 square kilometers of land, the Department of Energy holds at least 10,000 square kilometers, while the armed services lease about 80,000 square kilometers from other federal agencies, and there is an unknown amount of land owned by states which is devoted to military purposes (Renner, 1994).

The United Nations reported that military requirements have risen substantially in the twentieth century because of the increase in the size of standing armies and the rapid technological developments in weaponry (Center for Disarmament, 1982). Since World War II the amount of land required for military training has increased substantially. In WWII 4,000 acres were necessary to meet the full-scale tank and infantry maneuvers, whereas currently military officials report the need of at least 80,000 acres to carry out similar strategic exercises (Seager, 1999; Lanier-Graham, 1993). A WWII fighter plane required a maneuvering radius of 9 kilometers, while presently a fighter jet requires a maneuvering radius of 75 kilometers and this radius is expected to increase to nearly 200

kilometers in the next technologically advanced generation of jets (Renner, 1991). Presently, military flights travel in the stratosphere, 17 to 50 kilometers above the earth's surface, which contains the ozone layer responsible for capturing the damaging ultra-violet rays from the sun (Bertell, 2001). Military flights also travel as low as only 100 feet above the earth's surface and have been known to cause significant human health and emotional problems as well as disturbances to migratory patterns of various wildlife (Thomas, 1995).

The land that is used for bomb and missile tests during 'peace-fare' missions, or more accurately Wars of Deterrence, is scarred with craters and prone to significant degradation as weapons destroy natural vegetation, disturb wildlife habitat, erode and compact soil, silt streams and cause flooding (Biswas, 2000; Renner, 1993). Testing grounds for tanks and artillery contaminate the soil and ground water with all sorts of heavy metals and other toxic residues (Bertell, 2001; Biswas, 2000). One of the most enduring lethal legacies from Wars of Deterrence is the large tracts of land that are littered with unexploded ordnance (UXO). To make matters worse the unexploded munitions are not considered toxic substances and therefore are not applicable to the Resource Conservation and Recovery Act in the United States, which would mandate and prioritize their removal from the land (Lanier-Graham, 1993; Renner, 1991).⁴ One of the worst sites on U.S. soil may be the Army's Jefferson Proving Ground in Indiana. This site has been a munitions testing ground for over 60 years and in that time at least 23 million rounds of ammunition have been fired (Lanier-Graham, 1993). Military officials estimate that there are at least 1.5 million rounds that remain unexploded, some of which

are buried 30 feet beneath the earth's surface (Renner, 1991). The rich croplands of Indiana have experienced approximately one bomb, mine, or artillery shell detonation every minute during working hours (Thomas, 1995). The large size of this site, almost 56,000 acres, makes it impossible to secure the area from trespassers – hunters and wildlife frequently traverse the area. Another problem is related to misfired ammunition and bombs. In Nevada 275 square miles of public land had to be closed off because the Pentagon discovered “1,389 live bombs, 123,375 pounds of shrapnel, and 28,136 rounds of ammunition” (Renner, 1991: 135-136) that were apparently accidentally dropped outside an Air Force bombing range.

DOD has transferred approximately 16 million acres of training ranges contaminated with unknown quantities of UXO to private agencies or the public while the prospect for UXO removal remains undetermined (MTP & Environmental Health Coalition, 2001). Clearing shells from sites throughout the U.S. would require the destruction of what remains of the ecosystem; the land would need to be razed of its vegetation, the dirt removed with armored equipment, sifted, and then put back (Seigel et al., 1991). The destruction of productive land and our precious atmosphere is a byproduct of the military's appetite for violent domination, and collides with human and planetary security needs such as the preservation and enhancement of water sources, agriculture, and wildlife habitat.

As I noted in the introduction of this chapter, military sites have been deemed the most toxic, dangerous, and least regulated areas on earth (Seager, 1999; Shulman, 1992; Bertell, 1985). The production, testing, stockpiling, maintenance, and deployment of

4. I will provide more specific information about the Resource Conservation and Recovery Act (RCRA) in chapter three as I highlight some of the complexity associated with enforcing environmental law and

conventional, biological, chemical, electromagnetic and nuclear weapons consumes vast amounts of energy, and generates enormous quantities of toxic and radioactive substances, even under the strictest regulations (Sidel, 2000; Renner, 1993). Toxic substances are ubiquitous and virtually every major military installation in the U.S. has extensive toxic contamination (Renner, 1994; Seigel et al., 1991).⁵ The standard array of toxics include conventional materials such as fuels, industrial solvents, oils, propellants, paints, pesticides, radio-nuclides, electromagnetic radiation, and explosives (Seager, 1999; Thomas, 1995; Renner, 1993). Militaries are also responsible for routinely generating waste by-products such as contaminated sludge, paints, PCBs, phenols, heavy metals, cyanides, and acids. Yet, militaries consume, store, produce, and dispose of uniquely toxic wastes, many of which are secret (Biswas, 2000; Seager, 1993).⁶ The toxics that are unique to the military include propellant packs, explosive shells, explosives, obsolete chemical weapons, infectious bacterial waste from biological warfare experiments, and radioactive waste (Finger, 1991).⁷

regulation at the former military installation Rocky Mountain Arsenal.

5. Neither the U.S. Government Accounting Office nor the annual Defense Environmental Restoration Program report provides information about the 7000 foreign U.S. military installations, but independent investigations and Army correspondence suggest that foreign bases are as polluted as their domestic counterparts. U.S. military facilities, wherever they operate, are polluting the land, groundwater, surface water, and atmosphere. Although environmental compliance has proven to be problematic on domestic territory, it is suspected to be even worse on foreign territory. See Lenny Seigel et al., *The U.S. Military's Toxic Legacy: America's Worst Environmental Enemy* (Boston, MA: National Toxic Campaign Fund, 1991), 71-77.

6. The incessant secrecy associated with military activities means that there are significant gaps in knowledge regarding the types and quantities of wastes generated, appropriateness of disposal methods, and the environmental and health implications. Government regulators and community groups are consistently pressuring military officials to respect a community's right to know the extent and impact of military 'peace-time' activity. See United States General Accounting Office GAO-NSIAD-02-103, *Defense Environmental Issues: Improved Guidance Needed for Reporting on Recovered Clean-up Costs* (Washington, DC: October 2001), 2-8 and Seigel et al., 24-39.

7. Military waste associated with biological weapons production and experimentation is an area that remains unexplored here. Yet, the implications for the ecosystem and all life mirror the contamination effects from chemical and nuclear military activities. For example, the biological warfare tests on Gruinard Island after WWII have contaminated the island to such an extent as to make it uninhabitable since, hence another 'sacrifice zone'. See the following resources: Ed Regis, *The Biology of Doom: The History of*

The Department of Energy reports that at least 4,500 sites are contaminated to varying degrees from the production, stockpiling, testing, and dismantling of nuclear weapons (Sidel, 2000). The production facilities for nuclear weapons are some of the most contaminated sites on U.S. soil and will pose a significant threat for generations to come as the half-life of some of the lethal radioactive elements varies from tens to hundreds of thousands of years. The DOE estimates that there are 385,000 cubic meters of 'high-level' and 2.5 million cubic meters of 'low-level' radioactive waste currently occupying 'interim' storage in tanks, drums, and trenches which have proven incapable of neatly containing these deadly wastes (Rothstein, 1995; Kimball et al., 1993).⁸

The Department of Defense (DOD) produces a disproportionate share of the federal government's pollution (MTP & Environmental Health Coalition, 2001). DOD generates at least 20 million tons of hazardous waste each year, although this number represents only an estimate since some hazardous substances used or generated do not have to be reported because they do not appear on lists of chemicals used in the private sector (MTP & Environmental Health Coalition, 2001). As of 1999, the Department of Defense reported 28,000 toxic 'hot spots' on approximately 1,800 military facilities, and past experience dictates that these numbers will only increase (U.S. GAO-02-103, 2001). DOD sites comprised 81 percent of federal sites on the Environmental Protection Agency's (EPA) Superfund National Priorities List, which constitute the most hazardous sites of contamination slated for attempted clean-up in the United States (MTP &

America's Secret Germ Warfare Project (New York: Henry Holt, 1999) and John Bryden, *Deadly Allies: Canada's Secret War 1937-1947* (Toronto: McClelland & Stewart, 1989), and Barton J. Bernstein, "The Birth of the U.S. Biological-Warfare Program," *Scientific American* 256 (June 1987): 116-121.

8. One of the most contaminated sites in Hanford Washington has enough radioactive waste to cover the size of Manhattan Island with a lake forty feet deep. See Linda Rothstein, "Nothing clean about clean-up," *The Bulletin of Atomic Scientists* 51 (May 1995): 34.

Environmental Health Coalition, 2001). Current figures place more than 260 Department of Defense installations on, or proposed for inclusion, on Superfund (MTP & Environmental Health Coalition, 2001). The health of communities and vitality of the ecosystem are under constant assault as war preparations, and the unrelenting amounts of lethal waste that are generated, have no end.

A closer examination of the nuclear weapons industry in the U.S. reveals its colossal nature and the resulting nuclear nightmare the nation faces. The ecosystem and all its living creatures are caught in the crossfire of a battle to dominate the global military arena by producing the most destructive arsenal of weapons that apparently will 'deter' the 'enemy'. Since the 1940s the U.S. has prioritized a minimum of \$300 billion dollars for nuclear weapons design, manufacture, test, and inevitably dismantling (Renner, 1991). Furthermore, the political and technical questions related to nuclear waste disposal remain unresolved, and threaten to contaminate generations for thousands of years (Lowry, 1992). The magnitude of problems related to the nuclear industry is evident through an analysis just of radioactive waste generated from weapons stockpiling and the environmental implications of nuclear weapons testing.⁹

It is suspected that the U.S. currently has somewhere between 10,000 and 12,000 nuclear weapons in its stockpile, and has produced at least 60,000 nuclear weapons since 1945 (Ong, 2002; Kimball et al., 1993). Each step involved in nuclear bomb making involves a monumental assault against the environment and therefore inevitably all its living creatures. Consider that:

9. My analysis here is limited to the environmental implications of underground nuclear testing and atmospheric testing 480-km above the earth's surface (ionosphere). Chapter two presents a more detailed analysis of the implications of low-level atmospheric nuclear tests for the Marshall Island residents and their land.

“the production of a single kilogram of plutonium generates approximately 1,300 liters of liquid high-level radioactive waste laced with hazardous chemicals, more than 200,000 kilograms of low to intermediate waste, and almost 10 million liters of contaminated cooling water” (Renner, 1991: 146).

The mountains of waste generated from the production of one kilogram of plutonium is not only appalling, but also mind boggling when thinking about the total waste generated from the U.S. military's, or the world's armed forces, entire nuclear stockpile. Military reactors can be held accountable for approximately 99 percent of all 'high-level' nuclear waste and 78 percent of all 'low-level' nuclear waste on U.S. soil (Finger, 1991). The gravity of danger associated with such waste is often minimized by Pentagon and DOE officials, yet they have been forced to seek solutions to the breaches, leakages, and seepages of lethal wastes into water systems, agricultural soils, and the atmosphere (Kimball et al., 1993).¹⁰

Nuclear tests are justified to attain more powerful and sophisticated technological mastery of destructive forces. The U.S. began its Nuclear Test War on July 16, 1945 in New Mexico and has detonated at least 2500 nuclear bombs in different sites throughout the world since this time (Warner & Kirchmann, 2000). Although there has been intense public pressure to wield some measure of sanity over military officials, the tests continue today.¹¹ Six nuclear explosions have been detonated in the upper levels of our

10. Although the majority of communities are fearful and reluctant to accept DOE's radioactive waste, DOE targets economically depressed communities and promises investment and most importantly job opportunities to make the proposition of 'managing' or 'storing' nuclear waste more attractive. See David Lowry, "Nuclear Waste: The Millennial Problem," *Ecodecision* 4 (March 1992): 43. The environmental burden associated with military toxics has been disproportionately borne by indigenous people, people of colour, and people facing low income. The charge of 'environmental racism' against the military will be further substantiated in the two following chapters. See Winona La Duke, "A Society Based on Conquest Cannot Be Sustained: Native Peoples and the Environmental Crisis," Richard Hofrichter and Lois Gibbs, *Toxic Struggles: The Theory and Practice of Environmental Justice* (Philadelphia, PA: New Society Publishers, 1993), 98-106.

11. International agreements have been brokered by the United States, China, France, Britain, and Russia to ban atmospheric nuclear testing and nuclear testing in space. Underground tests are legally permitted but

atmosphere.¹² Between August and September 1958 the U.S. navy exploded three fission-type nuclear bombs 480 kilometers above the south Atlantic Ocean and called it 'Project Argus' (Bertell, 2001). In 1962 the U.S. military initiated three more tests under the guise of 'Project Starfish'; they reported two nuclear explosions several hundred kilometers in the upper ionosphere and one at 60 kilometers in the mesosphere (Bertell, 2001). The purpose of these tests appears to have been for an assessment the impact of high-altitude nuclear explosions on radio communication, and to increase understanding of the ionosphere and the behavior of charged particles within it to potentially harness the vast atmospheric energy sources for further destructiveness and domination (Bertell, 2001). Although the effects of these high-altitude nuclear explosions have never been fully revealed, or perhaps even studied, we do know that these "nuclear explosions created new magnetic radiation belts and injected sufficient electrons and other energetic particles into the ionosphere to cause worldwide effects" (Bertell, 2001: 64).

Radioactive fallout and the creation of magnetic force lines near the North Pole (aurorae borealis) are the most obvious and well-documented consequences associated with 'Project Argus'. Caesium-137, a nuclear fallout product, has been found in the Inuit people of Baker Lake (near Hudson Bay, NWT), their grasses, vegetables, milk and meat (Bertell, 2001). Public health officials have been noting extraordinary cancer rates and

are not suppose to exceed 150 kilotons. Yet, there is a history of known, and unknown, violations of these international agreements since their inception. For example, in May 1992 China detonated a one-megaton nuclear device underground. In addition, there are many tests that have gone unreported by all nations, and therefore we do not know whether they violated existing agreements or not. See Gary T. Whiteford, "Nuclear Bomb Tests: A Lingering Environmental Menace," *Ecodecision* 12 (April 1994): 87.

12. The layers of the atmosphere are designated as follows: the troposphere is between 9 and 16 km above the earth's surface, the stratosphere follows and continues to 50 km, the mesosphere follows and continues to 80 km, then the lower ionosphere (thermosphere) is between 80 and 100 km above the earth's surface, then the upper ionosphere (exosphere), which is between 100 and 600 km. Finally, the magnetosphere extends beyond 600 km above the earth's surface. See Rosalie Bertell, *Planet Earth: The Latest Weapon of War* (Montreal: Black Rose Books, 2001), 54-60.

reproductive impairments in the central Arctic area since these nuclear detonations, or 'death from the sky' as one Inuit woman describes it (Bertell, 2001). Cancer rates in central Arctic are up to 20 times higher than in eastern or western Arctic (Bertell, 2001). While the aurorae borealis that has been artificially created from nuclear explosions hundreds of kilometers in our atmosphere have been linked to the disruption of northern animal's migration patterns.¹³ The nuclear explosions of 'Project Starfish' seriously disturbed the lower Van Allen belts, altering both its shape and intensity. These tests practically destroyed the inner Van Allen belt for a period of time, thereby disturbing the earth's magnetic field and creating a new radiation belt which sometimes emits polar light (Bertell, 2001).¹⁴ In addition, large quantities of ionizing radiation were released, further ionizing the gaseous components of the atmosphere at this height, and strengthening the ionization effect from the release of radiation.

Underground testing became the favored method of nuclear assault since public pressure during the 1960s culminated in a ban on atmospheric nuclear testing. Underground tests are conducted in shafts drilled as deep as one mile into the earth's core (Whiteford, 1994). Each test releases a tremendous force of energy thereby carving out a high cavern filled with high-pressure hot gases (IPPNW, 1991). As the gases cool, the pressure drops and the earth caves in which then results in the creation of giant craters that permanently scar the landscape (Whiteford, 1994). Radioactive gases are released into the atmosphere, ground water is contaminated, and the blasts also fracture bedrock

13. The Inuit people of Baker Lake were evacuated by the Canadian government from their homeland of 3000 years because in 1957-58 the caribou, upon which the Inuit depended for food, clothing and shelter, did not migrate across the Northern Tundra. According to the 3000-year old oral history of the Inuit people this had never occurred. See Bertell, *Planet Earth*, 64-67.

14. Solar and cosmic particles are hurled toward earth and captured in the Van Allen belts, which reside 2000 to 51,500 km above the earth's surface. Yet, because of the spin and wobble of the earth the

and mesas (Whiteford, 1994). Some of the radioactive waste produced by nuclear testing contaminates the ecosystem for up to half a million years.

Scientists found that underground nuclear testing has caused a five percent ozone loss over the United States, and a twelve percent loss over the Arctic (Whiteford, 1994). Nuclear explosions loft atomic fireballs into the stratosphere, and the intense heat produces short-lived nitrogen ions, which cause a reaction with nitrogen, oxygen, and water vapor to produce nitrates and nitric acid (Bertell, 1993). Bertell suggests that “preparation for nuclear war was probably a significant component in the current acid rain crisis that now threatens our lakes, fish, trees, and human respiratory tract” (Bertell, 1993: 82). An additional environmental concern about nuclear detonations is the earthquakes generated from the explosive force that is unleashed. There is concern about the changes in frequency and pattern of earthquakes greater than 6.0 on the Richter scale since the Nuclear Test War commenced (Thomas, 1995; Whiteford, 1994). There are many examples of deadly earthquakes following a nuclear detonation. For example, five days after the U.S. detonated a nuclear explosion in 1992 there were two earthquakes in southern California measuring 7.4 and 6.5 on the Richter scale (Whiteford, 1994). While 800,000 people perished in an earthquake measuring 8.2 magnitude in Tangshan, China on July 28, 1976 which occurred only one day after a U.S. nuclear test (Whiteford, 1994).

There are also colossal amounts of chemical military toxics plaguing the U.S. The production of a massive arsenal of chemical weapons has created a lethal legacy in the U.S. over nearly six decades and remains largely unresolved.¹⁵ Eight U.S. army

innermost Van Allen belt dips down to within 200 km of the Earth above the southern Atlantic Ocean. See Bertell, *Planet Earth*, 58-59.

15. I provide only a minute sketch of the magnitude of problems related to ‘peace-time’ military activities of chemical weapons production and storage here. In chapter three I provide a more detailed

depots are currently responsible for the storage of chemical munitions and the stockpile is estimated at 40,000 tons of weapons (Sidel, 2000; Marshall, 1996).¹⁶ There are four deadly chemical agents currently in the U.S. Army's stockpile: mustard gas, GB or sarin, VX, and BZ (Marshall, 1996). All of the chemical munitions and most bulk containers are currently stored in igloos, which are covered with dirt, and reinforced with concrete bunkers that are approximately 90 feet long, 25 feet wide, and 15 feet high, or the size equivalent of a four-bedroom house (Birks, 1991). The stockpile of M55 rockets (containing GB or VX nerve agents), M23 mines (containing VX), 105-mm, 155-mm, 4.2 inch, and 8-inch projectiles (containing GB, VX, or mustard), MC-1 MK94 bombs (containing GB), and the one-ton containers of nerve agents are between ten and forty-five years old, while new binary weapons continue to be produced (Birks, 1991).

The safe storage of chemical weapons is dependent upon their total confinement and stability, yet chemical warfare agents in general are reactive compounds that tend to be unstable when stockpiled (Guir, 1997; Lohs & Stock, 1997). The main threat of chemical warfare comes not from an external 'enemy', but instead from the testing, storage, transportation and disposal on domestic territory (Lanier-Graham, 1993).¹⁷ The threats associated with chemical leakages and breaches, public pressure, and the Chemical Weapons Convention agreement all combined have forced the Army to deal

analysis of Rocky Mountain Arsenal. The Arsenal exemplifies the magnitude of chemical contamination and lethal toxicity that lingers as a result of chemical warfare preparations.

16. Chemical munitions are stored at Lexington, Kentucky; Newport, Indiana; Tooele Utah; Aberdeen, Maryland; Umatilla, Oregon; Anniston, Alabama; Pine Bluff, Arkansas; Pueblo, Colorado while the chemical weapons storage and incineration site at Johnston Atoll in the Pacific closed in November 2000. See Kentucky Environmental Foundation for the Chemical Weapons Working Group, "Common Sense." (Berea, KY: February 2002), 1-6.

17. The M55 rockets are representative of the types of problems to expect from other stockpiled weapons. These rockets containing VX or GB are leaking from the munitions and could potentially ignite the other 2,000 rockets stored in a single igloo. See John W. Birks, "Weapons Forsworn: Chemical and

with their aging and deteriorating chemical arsenal.¹⁸ Yet, a budget request from the Bush Administration on February 4, 2002 ranked the Army's efforts thus far as 'ineffective'. The document stated:

"The Army's program to destroy the U.S. stockpile of chemical weapons is behind schedule. Costs have increased over 60%, from \$15 billion to \$24 billion. These delays are the result of various difficulties, including unrealistic schedules, site safety and environmental concerns and poor planning" (Kentucky Environmental Foundation, 2002: 1).

There has been substantial study of the handling, transportation, storage, and disposal of chemical munitions, yet the scientific studies conducted thus far point to significant limitations in our current knowledge about the effects of disposing of these chemicals for the ecosystem (Lohs & Stock, 1997). The methods available to dispose of chemical weapons have included ocean dumping, land burial, open-pit burning, chemical 'neutralization', bio-remediation, or incineration (Guir, 1997). Each of these methods has significant negative health implications and environmental hazards (Marshall, 1996). When ocean dumping, land burial, and open-pit burning were banned in 1969, chemical incineration was initiated (Sutherland, 1997). Citizen groups have opposed this method of disposal because of their experiences with the deadly byproducts from incineration and the unburned particulates released into the atmosphere. The Army maintains that incineration technology is 'state of the art', while the emissions are 'unavoidable' and within 'acceptable limits' (Kentucky Environmental Foundation, 2002).¹⁹

Biological Weapons," Anne H. Ehrlich and John W. Birks, *Hidden Dangers: Environmental Consequences of Preparing for War* (San Francisco: Sierra Club Books 1991), 171-175.

18. The Chemical Weapons Convention was ratified by sixty-five nations in 1997 to ban the development, production, acquisition, stockpiling, transfer, and use of chemical weapons. The signatories are also obligated to destroy their CW stockpiles within 10 years. See Victor W. Sidel, 438-439.

19. In chapter three I provide some detail about the incineration of aging, leaking, and unstable chemical weapons at Rocky Mountain Arsenal in the 1970s, as well as the incineration of chemically-ridden toxic waste in the mid 1990s that was generated from the production and disposal of chemical weapons. Despite the lethal toxic emissions that have been documented from past experiences the Army continues to propose chemical incineration for their stockpiles. It should be noted that citizen groups living near the proposed

I have provided the previous details about 'peace-fare' missions to exemplify the assertion that all militaries, worldwide, wreak environmental havoc during times of 'peace' where the mission is to maintain a readiness for domination in war (Seager, 1999; Seigel et al., 1991). Joni Seager asserts that military presence is virtually the single most reliable predictor of environmental damage anywhere in the world (Seager, 1993). In the pursuit of 'national defense' and human 'security' the U.S. military has cast a chemical and radioactive plague throughout their own land. The toxic and radioactive pollution produced from military activities arguably pose a greater threat to the well-being and security of American people than any external threat (Thomas, 1995; Seigel et al., 1991). The worst possible irony is that the military destroys large tracts of land and leaves a trail of pollution in their efforts to 'protect'. Michael Renner suggests that "preparing for war resembles a scorched-earth policy against an imaginary foe" (Renner, 1991: 135). The aftermath of this scorched-earth policy reveals that the target is not imaginary at all, but instead the ecosystem and all its life.

All military toxics are contaminating water used for irrigation and direct consumption, contaminating the food chain, befouling the atmosphere, and rendering vast tracts of land unusable for generations (Thomas, 1995). The major environmental concerns – acid rain, ozone depletion, climate change, water contamination and soil erosion – can all be linked to military activities (Bertell, 2001; Bertell, 1993).²⁰ The

incineration facilities continue to rail against the Army's preferred method and have recently made gains to convince the Army to chemically neutralize the weapons. For example, an Alabama governor, Don Seigelman, launched a lawsuit against the Army in February 2002 to prevent them from beginning chemical incineration in Anniston, while in Arkansas the Army is considering neutralization over incineration due to public pressure regarding the safety of pollution emissions. See Kentucky Environmental Foundation for the Chemical Weapons Working Group, 1-2.

20. The pH shift in the Northern atmosphere and the production of nitric acid are both linked to the thousands of nuclear detonations that have taken place since the end of WWII. Soil depletion is linked to the plethora of chemicals that have been adapted for military applications. Ozone destruction, climate

degradation of one part of our ecosystem combines with another and reverberates throughout our entire biosphere; some of the results have included an alarming loss of biodiversity and species, an increase in allergies, asthma, cancer, and significant reproductive anomalies (Bertell, 1993). Arthur Westing suggests that since approximately six percent of the combined gross national products of the world's nations are devoted to military expenditure, at least six percent of the world's environmental pollution must be attributed to the military sector of the global economy (Westing, 1988). While Ruth Leger Sivard estimates that the military is responsible for between 10 and 30 percent of global environmental damage, 6 to 10 percent of worldwide air pollution, and 20 percent of all ozone-destroying chloro-fluorocarbon use (Thomas, 1995: 17).

The lethality of the U.S. military's 'peace-time' activities, the infinite preparations for war, is most obvious in the irrevocable, environmental wreckage, the 'national sacrifice zones'. Yet, the degradation of the ecosystem and human health from military pollution is not always visible, immediate, or direct (MTP & Environmental Health Coalition, 2001). However, military toxics seep, migrate, spew, leak, and burp, to name a few of the trivializing terms adopted to signify toxic contaminants, while neighbors of military operations and their families, active service men and women, veterans, and civilian employees of the military and defense contractors cannot avoid their negative impact. "Communities and individuals suffer from elevated cancer rates, intergenerational health problems, loading of our environment with toxic and hazardous pollution, contamination of subsistence food chains, nuclear safety threats, intolerable

change and the greenhouse effect are linked to military space missions, whether for testing cruise missiles, transcontinental missiles, or anti-scuds, which emit colossal amounts of hydrochloric acid and smog-producing compounds such as oxides of nitrogen and dioxins. See Rosalie Bertell, "Exposing the Agenda

noise and disruption, bombing of sacred areas, and destruction of wildlife habitat” (MTP & Environmental Health Coalition, 2001: 2).

In the mid 1980s a U.S. base commander in Virginia responded to community concerns about toxic waste by saying “we are in the business of protecting the nation, not the environment” (Renner, 1994: 23). Although this may not be an entirely antiquated opinion among some military officials, the Pentagon has begun to address the plethora of environmental dilemmas due to their missions (Westing, 2000).²¹ The U.S. armed forces are technically supposed to abide by the same environmental protection laws that apply to civilian operations (Westing, 2000). All Pentagon clean-up programs have been funded through the Defense Environmental Restoration Account, which is then supervised by the Defense Environmental Restoration Program (DERP) (U.S. GAO-02-103, 2001; Bearden, 1999).²² The Department of Defense reports that they have made tremendous progress in cleaning up the contamination that has occurred as a result of decades of training and preparing for its ‘national defense mission’ (U.S. DOD-DERP, 1999). Beginning in the 1980s their efforts focused mainly on identifying the extent of

of the Military Establishment,” *Ecodecision* 10 (September 1993): 81-82 and Lenny Seigel, “No Free Launch,” *Mother Jones* (September/October 1990): 24-25.

21. Seth Shulman notes that there is an internal struggle in the military between rank military men and civilian-career military men about environmental responsibility. He notes that civilian engineers responsible for environmental clean-up and compliance are pitted against their military counterparts who administer the pollution-generating installations. The reality is that action-oriented military missions have little to do with environmental protection and restoration. Environmental issues are prioritized secondarily to the ability to win in combat, and since war and preparations for war are inherently destructive it remains paradoxical how the Pentagon will in fact work in harmony with the ecosystem. See Seth Shulman, *The Threat at Home: Confronting the Toxic Legacy of the U.S. Military* (Boston, MA: Beacon Press, 1992), 115-125.

22. My analysis here is only on the Department of Defense’s efforts and progress under DERP. DOE clean-up is managed by its Office of Environmental Restoration and Waste Management (ERWM). The clean-up activities include: waste management programs to bring facilities into compliance with environmental and safety requirements; the treatment, containment and disposal of toxic and radioactive wastes; and the elimination or reduction of risks posed by contamination. See Daryl Kimball, Lenny Seigel, & Peter Tyler, *Covering the Map: a survey of military pollution sites in the United States* (Washington & Litchfield: Physicians for Social Responsibility and Military Toxics Project, May 1993), 1.9-1.10.

contamination and the 'imminent threats' (U.S. DOD-DERP, 1999). The 1990s marked a continuation of DOD's assessment of its 'environmental responsibilities', the initiation of some environmental clean-up, and the establishment of Restoration Advisory Boards which comprise community members who participate in decisions regarding the restoration process (Bearden, 1999).²³

Despite claims of 'milestone achievements' and perceived positive recognition from critics regarding their environmental restoration efforts, there has been very little clean-up progress because DOD has typically spent the majority of their budget on investigations and studies rather than actual remediation (U.S. DOD-DERP, 1999; Renner, 1994). Critics, including the U.S. Government Accounting Office and citizen groups, have also noted that the word 'clean-up' is a misnomer because the military is often unwilling to dedicate the money necessary to truly decontaminate sites (Seigel et al., 1991).²⁴ This is deeply problematic since the longer a site remains contaminated, the greater the threat it poses to groundwater, soil, and inevitably human health (Seigel et al., 1991).

23. An important question that remains unresolved is whether community representatives will have access to public funds to hire independent technical expertise to analyze the military installations or bases slated for closure. See Michael Renner, "Military Mop-up," *World Watch* (September 1994): 23-28.

24. The GAO is the investigative arm of Congress, which is virtually the only non-military agency to have compiled a substantial body of information on the military's stewardship of the environment. The GAO notes that the military's hazardous waste program has a long way to go; GAO has found storage and waste problems, poor record keeping, hazardous waste management, and ground water monitoring. See Shulman, 10-19. DOD reports that by fiscal year 1999 over 17,000 sites reached 'Response Complete' which means that all investigation and clean-up activities are finished and all that remains is monitoring. Yet, current military practices of merely 'capping' waste with cement or incinerating it do not resolve the environmental threats that stimulated an initiative to eliminate these toxic contaminants in the first place. Chapter three details some aspects of the environmental clean-up at Rocky Mountain Arsenal that is deemed 'completed' according to military officials, while residents living nearby continue to have grave concerns about the military's notion of 'clean-up'. See U.S. Department of Defense, *Defense Environmental Restoration Program, Fiscal Year 1999 Annual Report to Congress* (U.S. DOD, February 12, 2002, <http://150.80.61/derparc/derp/Index.htm>), 14-17.

In addition, DOD notes that successful completion of restoration at its sites can be accomplished through private-sector innovation and capital to expedite the process (U.S. DOD-DERP, 1999). Yet, critics have pointed out that the government's reliance on private contractors could undermine the quality, reliability, and public confidence in clean-up and oversight (Seigel, 1991). The main problem with private contractors lies in the fact that they are typically the ones hired to fulfill defense contracts, and therefore are responsible for mountains of radioactive and toxic wastes, as well as millions of pounds of chemical emissions, and then are permitted to profit yet again from the clean-up of their mess (Seigel, 1991).²⁵

The costs of environmental restoration at American bases and installations are estimated at upwards of \$400 billion, and this does not account for military pollution, hazardous materials, and toxic waste at their overseas bases (Seager, 1993). A 1991 Congressional report reveals an even more salient consideration that "despite the spending of billions of dollars, it may be impossible with current technology to remove contaminants from ground water and deeply buried soils near many of the military installations" (Seager, 1993: 33). The grim reality is that complete environmental restoration is to some extent a technological frontier (Renner, 1994). Michael Renner notes that "some sites may just be too contaminated to be safe ever again for human use. Many others could take generations, or at least years, just to stabilize" (Renner, 1994:

25. An additional problem is recovering costs from non-DOD parties, i.e. private contractors, which have contributed to the magnitude of contamination at military sites. The U.S. General Accounting Office reported that the data report in fiscal year 1999 was more extensive than the previous year, but because DOD is silent or unclear on key aspects of reporting the data still remain inaccurate, inconsistent, or incomplete. "As a result, the data are not useful for management and oversight because neither the Congress nor the Department can determine the extent of progress being made in recovering costs or the extent to which cost recoveries may offset environmental clean-up costs." (U.S. GAO-02-103, 2001: 2). In the end this means that the public is stuck paying the monumental costs due to the environmental wreckage produced by DOD and its military contractors. See U.S. GAO-02-103, October 2001, 1-9.

25). The only solution remaining to deal with the areas, poisoned beyond rehabilitation, is to fence-off the site and deem it a 'sacrifice zone'. The implication for the ecosystem and future generations is lethal.

Despite military claims that they are concerned with the lethal contaminants they have produced and dumped in tens of thousands of sites since the end of WWII just on their own land, they continue to request exemptions from environmental, worker protection, worker protection, and public safety laws (MTP & Environmental Health Coalition, 2001, Shulman, 1992).²⁶ In addition, the Pentagon insists on running its own clean-up program and consistently prohibits outside regulation or oversight (Shulman, 1992). The reality is that the military's daily operations remain beyond the reach of civil law, and protected from public and government scrutiny even in so-called democracies (Westing, 2000; Seager, 1999; Thomas, 1995). Although the extent to which the military must comply with environmental, worker, and public safety laws varies from statute to statute there are generally four ways by which defense-related agencies avoid compliance. The methods to evade environmental, health and safety laws include: direct exemption, sovereign immunity, Executive Orders, and the Unitary Executive Doctrine, and national security exemption (MTP & Environmental Health Coalition, 2001).

Direct exemption means that some laws contain language that specifically exempts the military from either the entire law or its most important portions; the military is specifically exempt from the Oil Pollution Act, the Noise Act, and laws governing the

26. In March 2001 Navy, Army, and Marine Corps high ranking officers all requested increased 'flexibility' from Congress; in other words they are requesting that laws do not interfere with any of their 'national defense missions'. For example, Vice Admiral James F. Amerault testified before the Senate Armed Services Committee on Readiness and Management Support that "some of these laws and regulations ... were drafted without due consideration for national defense missions" (MTP & Environmental Health Coalition, 2001: 3). See Military Toxics Project & Environmental Health Coalition.

Navy's nuclear activity or waste (MTP& Environmental Health Coalition, 2001). Many environmental statutes have language stating that their requirements should apply to the federal government. Yet, the federal government is not bound by their own laws unless Congress waives sovereign immunity, and unfortunately court cases have repeatedly found that unless there is an unequivocal waiver the law cannot be fully enforced against the military (MTP& Environmental Health Coalition, 2001; Shulman, 1992). The application of environmental laws through Executive Order, rather than through Congress, undermines its application because many are not enforceable and can be rescinded at any time (Shulman, 1992).²⁷ The Unitary Executive Doctrine impedes enforcement of laws against federal agencies even if Congress waives sovereign immunity.

“This doctrine holds that one agency of the Executive Branch (such as the EPA) cannot take another Executive Branch agency (like the military) to court or issue binding administrative orders against another agency without the prior opportunity to contest the order within the Executive Branch” (MTP & Environmental Health Coalition, 2001: 7).

The result is that the military consistently challenges environmental watchdogs to the point where agency's, like the EPA, enforcement mechanisms are debilitated (Shulman, 1992; Finger, 1991). Finally, all major legal statutes allow the President or his agents to exempt any public or private entity from legal provisions for ‘national security’ reasons where it is “in the paramount interest of the United States to do so” (MTP& Environmental Health Coalition, 2001: 8).

Defend Our Health: The U.S. Military's Environmental Assault on Communities (Lewiston, ME & San Diego, CA: June 2001), 2-3.

27. Executive Orders are official documents whereby the President communicates to his appointees and agency head directives about management activities of the Federal Government. See Military Toxics Project & Environmental Health Coalition, 7-13.

The notion of 'national security' has been invoked many times, yet it has been defined almost exclusively in military terms and often within a cloak of secrecy and silence (Seager, 1999; Thomas, 1995; Renner, 1993). This secrecy serves as a gatekeeper of power; it privatizes access to knowledge and it constructs a mystification about the work of the military (Seager, 1999). 'National security' has been invoked to justify the relentless pursuit and maintenance of large armed forces, the production and deployment of the most destructive weapons systems, and the frequent intervention in the affairs of weaker nations (Renner, 1993). While the military invokes 'national security' exemptions from environmental laws, communities plagued with military toxics have responded by establishing four principles that should guide military activity. They are: precautionary principles, right-to know principles, pollution prevention, and environmental justice (MTP & Environmental Health Coalition, 2001; Seigel et al., 1991).

The precautionary principle requires that we should not wait to see if harm will occur; instead we should assume military operations are harmful until proven safe. The precautionary principle is necessary to shift the burden of toxic proof from communities to the polluters which are introducing thousands of new chemicals into our environment each year (MTP & Environmental Health Coalition, 2001). The principle of right-to-know promotes the public's right to access all information about the production, use, storage, transportation, exposure, and compliance of all military operations. Pollution prevention must be conceptualized beyond 'acceptable limits' of environmental pollution to encompass reduction and elimination of hazards and environmental impacts at every stage of military activity (Seigel et al., 1991). Environmental justice exposes that poor

people, tribal peoples, and people of colour bear the brunt of 'peace-time' military polluting technologies and activities (Bullard, 1998; Marshall, 1996). The following three chapters will demonstrate that environmental justice is required for communities which have endured a horrific military chemical, nuclear, and biological assault resulting from the Wars of Deterrence.

The growing disclosures of military atrocities committed against our ecosystem, and therefore inevitably all living creatures, since the end of World War II during times of 'peace' reveals the paramount contradiction in the infinite pursuit of military preparedness to deter one's 'enemy' and achieve 'peace'. The contradiction is that as we accumulate more powerful and sophisticated weapons in the pursuit of 'national security' we are in fact amplifying not only domestic, but also planetary insecurity. 'National security' pursuits, under the guise of 'peace-fare', have permitted lethal military contamination to a degree that blurs any understanding of concepts like the 'enemy' or 'peace'. This is because the Cold War established a state of constant military assault whether it is deemed 'peace' or 'war'. I have referred to this assault as Wars of Deterrence because the readiness for war posture entails its own assault, and this time the enemy is the ecosystem and the life that depends upon it.

The paradox inherent in infinite preparations for war to deter the 'enemy' and achieve 'peace' is that as the most powerful militaries develop, deploy, and test ever-more sophisticated weaponry they are contributing to the destabilization of the nations, people, and ecosystem that they claim to protect. In the following two chapters it will become evident how a conceptualization of 'enemy' and 'security' becomes inverted as communities face substantial internal threats and horrific contamination, some of it being

irrevocable, more than 'threats' from an external 'enemy'. 'Peace' since the end of WWII remains illusive for the communities which have born the brunt of military 'peace-time' missions. The infinite preparation for war blurs any distinction between 'peace' and 'war' as civilians and the ecosystem endure a lethal chemical, biological, and nuclear assault in these Wars of Deterrence. The current conceptualization of 'national security' needs interrogation and re-formulation because this concept is truly meaningless if it does not encompass the preservation of all life on earth. If we pursue a policy of military security at the expense of human and ecological security are we merely "dismantling a house to salvage materials to erect a fence around it" (Renner, 1993: 90). The extent of current environmental degradation related to military missions threatens to imperil our nation's most fundamental aspects of security – the natural support systems, which all human activity depends upon.

Chapter 2: Environmental and Civilian Wreckage Part I: Marshall Islands

**“We are already dying from nuclear war while you are thinking of how to prevent it”
Chailang Palacios, Northern Marianas (de Ishtar, 1994: 20)**

The supremacy and grip of the U.S. military is so great that they are capable of poisoning people throughout the world. The Marshall Islands, located in Micronesia, illustrate the global nature of militarized environmental destruction since it has been a favorite dumping and testing ground for the U.S. military. My analysis in this section will try to illuminate some of the complexity associated with the U.S. military’s ‘peace-time’ atomic testing in the Pacific since World War II (WWII). ‘Peace’ achieved through deterrence has entailed nuclear war for some of the Earth’s inhabitants since the end of WWII. The International Council for Science reports that between 1945 and 1998, 2419 nuclear tests, 541 in the atmosphere and 1878 underground, were conducted worldwide (Warner & Kirchmann, 2000). The United States and the former Soviet Union are responsible for approximately 80 percent of the tests and 90 percent of the yields. This amounts to an appalling explosive energy equivalent of 550 million tons of TNT (Warner & Kirchmann, 2000). In addition, it is important to understand that almost all of the atomic bombings have taken place on the land of indigenous peoples, including the Shoshones, Aleutians, Kazakhs, Uygurs, Australian Aborigines, and Pacific Islanders (Seager, 1999; Thomas, 1995). My focus here will be on the horrendously negative impact of the Nuclear Test War for some Pacific Islanders living in the Marshall Islands.

The U.S. has decimated the social and physical well-being of the people inhabiting these islands and atolls in the Pacific. The strategic posture of deterrence and ‘peace’ achieved through military readiness, supremacy, and reign is not simply de facto

disregard for human and ecological life; it is a direct assault whereby the infinite production of more sophisticated weaponry justifies its infinite test. Nuclear testing has meant that the U.S. military has waged war against Pacific Islanders without ever officially declaring it. The Islanders avoided the crossfire between Japanese and American soldiers during World War II by hiding in the mountains, but the frenzy of nuclear testing has made people and their systems of life support the direct target. The history of the Nuclear Test War is a disturbing and horrifying legacy of forced migration, lost land rights which have upset subsistence living and decimated local cultures, and has poisoned inhabitants with lethal levels of radiation for generations. Indigenous peoples in the Pacific have experienced the nuclear age to an extent beyond anything imaginable in other regions of the world. The U.S. has forced the political, social, and economic programs of the nuclear industry on Pacific Islanders that were not acceptable at home (de Ishtar, 1994).²⁸

The purpose of what follows is to trace and recount the devastating human and ecological impact from the U.S. military's 'peace-time' activities in the Marshall Islands. I begin by providing a brief history of this region in the Pacific to highlight a general understanding of four centuries of colonialism that culminated in U.S. control of the region. In 1947 the U.S. claimed Micronesia, with the sanction of the United Nations, as a 'Trust Territory'. The U.S. suggested that they would protect the local population and their resources, and in return were permitted to fortify whichever islands they pleased.

²⁸ It should be noted that the U.S. was not the only country to impose its nuclear madness in the Pacific. France, Britain, and Japan have also waged a Nuclear Test War against Indigenous peoples of the Pacific. See Zohl de Ishtar, *Daughters of the Pacific* (North Melbourne, Australia: Spinifex, 1994), 1-17 and International Physicians for the Prevention of Nuclear War, *Radioactive Heaven and Earth: The Health and Environmental Effects of Nuclear Weapons Testing In, On, and Above the Earth* (New York, NY: The Apex Press, 1991), 69-88.

After WWII Micronesia was heavily militarized by the U.S.; islands were burdened with military bases, intelligence training grounds, supply routes, and a U.S. nuclear 'exercise' that in reality was a war-zone for the inhabitants (U.S. DOE, 1994; Bedford, 1986). As so much information must fall away I am compelled to focus on the initiation of the U.S. Nuclear Test War at Bikini Atoll in 1946, and the largest thermonuclear explosion on record that arguably purposely exposed indigenous people to the bomb's fallout for twisted military-science research. The Nuclear Test War is a story that must be recounted to determine how to find a way to its opposite.

The Marshall Islands, which comprise 29 atolls and five islands, were formed millions of years ago by volcanic eruptions on the sea bed (Weisgall, 1994). A coral shelf began to grow upward from a submerged volcano that rose about 15,000 feet from the ocean floor (Weisgall, 1994; Dibblin, 1988). As the volcanoes sank back into the sea bed, live coral with its colonies of tiny animals continued to grow and form coral reef. Eventually a necklace of small, flat islands formed around a central lagoon where the volcanic peak had once been (Dibblin, 1988). Seeds blown by winds were deposited on the islands and islets, and trees and vegetation grew over time (Weisgall, 1994). It is suspected that the first settlement in Micronesia, west of the Marshall Islands in present day Guam, Yap, and Belau, occurred between 3000 and 2000 B.C. (Dibblin, 1988). A later wave of travelers around 1000 B.C., possibly from the south, inhabited what would be deemed the Marshall and Gilbert, the last names of two British colonialists, chain of islands in east Micronesia (Dibblin, 1988). It was not until four centuries ago that the people in Micronesia, which consists of the Marshall, Caroline, and Mariana islands, encountered Europeans and North Americans. Tragically, this encounter entailed

colonial pursuits that initially began with economic exploitation, slavery and Christian religious indoctrination, but in the last half-century have culminated in mass geographic dislocation, starvation, and severe health problems related to nuclear weapons explosions during the Nuclear Test War.

The colonization of Micronesia spanned four centuries, beginning with Spain, Germany, Japan, and presently continues with the United States. The history of each country's involvement at these islands throughout the Pacific is complicated, and therefore my analysis here is only partial.²⁹ In addition, although each region experienced colonialism to differing degrees there are patterns of similarity: the lethality of European diseases, the dispossession of land, the decimation of a people and their culture (de Ishtar, 1994). Hilda Halkyard-Harawira, a Maori woman from New Zealand, speaks of colonization:

"The colonizers had many faces. They were British, French, German, American, Spanish, Japanese, and Dutch. They had many faces and many tongues but they had one purpose: to uproot the existing lifestyle and implant their own societies in order to acquire the land. That basically is the bottom dollar of colonialism – the acquisition of land by any means possible" (de Ishtar, 1994: 6).

The Japanese ruled Micronesia for thirty years until the autumn of 1944 when it was taken by the U.S. (Salvador, 2002). A National Geographic article in 1945 promotes the U.S. military presence in the Marshall Islands:

"Uncle Sam has now taken charge. The opening began on D-Day, January 31, 1944, when our forces unleashed a superbly co-ordinated amphibious attack against Kwajalein Atoll, centre of the Marshall Islands area" (Dibblin, 1988: 17).

29. The post WWII transition from Japanese occupation to U.S. military occupation at Kwajalein, Bikini, and Eniwetok are the limits to my analysis. See Francis X. Hezel, *Strangers in Their Own Land: A Century of Colonial Rule in the Caroline and Marshall Islands* (Honolulu, HI: University of Hawai'i Press, 1995) for an analysis of colonization in the last century. Also see Jane Dibblin, *Day of Two Suns: Nuclear Testing and the Pacific Islanders* (New York, NY: New Amsterdam Books, 1988), 3-20.

The two years leading up to the shift in colonial powers have been described as some of the bloodiest battles witnessed in the Pacific during WWII (Dibblin, 1988). U.S. Army pictures of Kwajalein show horrendous destruction; buildings were completely flattened, most palm trees decimated with the remainder decapitated, while no shrubs or smaller trees survived the pounding of shells and bombs which amounted to 20,000 tons of TNT (Dibblin, 1988). An Army observer suggested that “the entire island looked as if it had been picked up to 20,000 feet and then dropped” (Dibblin, 1988: 17).

The destruction continued after the war since the U.S. wanted to wipe out all evidence of the Japanese presence. American newcomers to Micronesia systemically wiped out all infrastructure established by the Japanese bragging that they would show Micronesians what Americans were capable of building. Chailiang Palacios, a Marshallese woman working with the organization Women Working for a Nuclear Free and Independent Pacific, remembers her parent’s disdain and disbelief regarding Japanese and U.S. battles on their land:

“After the war the Americans came ... I remember my parents shaking their heads and saying ‘My God, because of America and Japan we have suffered so much’. My beloved father couldn’t understand the stupidity of the American soldiers. He saw his own home completely built from the ocean and with just two holes from the bombs and the American soldiers coming with their bulldozers and destroying all the houses and all the roads. The Americans hated the Japanese so much that they had to destroy everything. They didn’t want to be reminded of anything that had been in the possession of the Japanese” (WWNFIP, 1987: 12).

Unfortunately since this time the Americans have built very little of real use to Micronesians; U.S. military bases and U.S. post offices account for the biggest and best equipped buildings while people who were capable of providing all their subsistence needs are now economically dependant on the U.S. and a money economy that has failed and impoverished them (Dibblin, 1988).

In July of 1947 Micronesia's political future was determined by the U.S. Administration and the Security Council of the United Nations (Salvador, 2002; RMI Embassy-USA, 2002; Thomas, 1995). Together they decided Micronesia would be a strategic Trust Territory of the Pacific Islands; the Trust Territory included the Marshall Islands, the Caroline Islands (which included Kosrae, Pohnpei, Truck/Chuuk, Yap, and Belau or Palau), and the Mariana Islands (which include Guam, Saipan, and Tinian).³⁰ The mandate of 'Trust' permitted the U.S. to fortify the islands, and in return they would agree to protect the health of the inhabitants, guard against the loss of land or resources, and promote economic advancement and sufficiency (RMI Embassy-USA, 2002). Micronesia is coveted for its strategic potential since it is positioned on the sea routes to Africa and the Persian Gulf through the Indian Ocean (de Ishtar, 1994). Unfortunately for the Islanders their land and lives have been locked into the U.S. military maneuvers to establish military facilities from Alaska to the Antarctic and the arena of superpower competition and conflict (de Ishtar, 1994; WWNFIP, 1987).

In the early 1980s the United States exchanged its UN custodianship of the region for the Compact Free Association which meant that the territories would be granted 'independence', but would receive annual cash payments in return for continued military fortification (Woodard, 1998). Independence is illusive as the U.S. maintains its military presence along with the right of 'strategic denial'. This means that they decide whether a foreign military can enter the region (Woodard, 1998). These arrangements have

30. Micronesia covers an ocean area the size of the continental U.S. The three island chains – the Carolines, Marshalls, and Marianas – consist of 2,141 islands, and about 100 of these are inhabited. The islands are divided into five separate political units; the Federated States of Micronesia, the Republic of Belau (Palau), the Republic of the Marshalls, and the Territory of Guam. See Women Working for a Nuclear Free and Independent Pacific, *Pacific Paradise Nuclear Nightmare* (London: CND Publications, 1987), 15.

translated into continued international acceptance of U.S. annexation of land and resources for military objectives with an accompanying absolute disregard for the physical and social well-being of Micronesian people, despite their claims that they are encouraging and developing self-sufficiency. It is not simply a despicable irony that the United States only fulfilled the militarized aspects of their 'Trust' agreement in Micronesia, but an examination of the militarization of this region exposes the paradox in their claims to protect resources and the health of Pacific Islanders. The history of nuclear testing, and the resulting Nuclear Test War that has been waged against indigenous peoples and their land, presents a disturbing and terrifying interpretation of 'protection' offered by the U.S. military.

The Nuclear Test War in the Pacific began in 1946 and its presence lingers today as the radioactive contamination remains in some areas between 30,000 years (Bikini) and 250,000 years (Runit) (Keju-Johnson, 1998). The U.S. admits to conducting 106 tests between 1946 and 1962; 12 at Johnston Island, 43 at Eniwetok, 24 at Bikini, 24 at Christmas Island, and three in the Pacific Ocean (Warner & Kirchmann, 2000; U.S. DOE, 1994; IPPNW, 1991). The Marshall Islands were the site of 67 reported tests (Thomas, 1995; U.S. DOE, 1994). It is important to note that what the U.S. admits and what they have done do not always correspond. For example, in December 1993 evidence came to light that an additional forty-eight bombs were detonated but not announced (de Ishtar, 1994). The Marshall Islands were selected for nuclear detonation partly because of their remoteness, sparse population, and partly because of the U.S. public's arising fears about nuclear testing due to their experiences with the Nevada Test Site (Salvador, 2002; IPPNW, 1991). The International Council for Science reports that the explosive yield

values are available for all but five of the reported tests; the total energy yield for the tests that had their yields reported was greater than 151 Mt (Warner & Kirchmann, 2000). The tests conducted at Bikini produced yields of 77 Mt and constitute the most intense amounts of radiation doses for the people and their ecosystem (Warner & Kirchmann, 2000). There are many horrific tales to tell from the Nuclear War Test. I recount two despicable and disturbing events connected to the Nuclear Test War that began in 1946. Bikini Atoll initiated this war thereby displacing and poisoning its former inhabitants, and it was also the battleground where the world's largest thermonuclear explosion was detonated in 1954.

Commodore Ben Wyatt, American military governor of the Marshall Islands, arrived in Bikini on February 10, 1946 to meet with the local population and discuss the military's plans to initiate its 'peace-time' nuclear weapons testing program on their island (Niedenthal, 1997). U.S. Navy records reveal that Wyatt used Christian parables to convince Chief Juda at Bikini to abandon their land; he "compared the Bikinians to the children of Israel whom the Lord had saved from their enemy and led into the Promised Land" (Dibblin, 1988: 21). They were also told that American scientists are trying to use the atomic bomb to achieve 'peace'; "experimenting with nuclear devices would with God's blessing, result in kindness and benefits to all mankind" (IPPNW, 1991: 73), and that they were "testing atomic bombs for the good of mankind and to end all world wars" (Seager, 1993: 65). After Wyatt asked if the Bikinians would be willing to 'sacrifice' their island for the 'welfare of mankind', they were given only minutes to confer and decide (Dibblin, 1988).

Darlene Keju-Johnson, a Marshall Islander, reports that very few Marshallese spoke English or understood the magnitude of what the U.S. military was requesting (Keju-Johnson, 1998). She also notes that the one word that stuck in the mind of King Juda, the chief of Bikini at the time, was 'mankind' because it was in the bible (Keju-Johnson, 1998). After only minutes of confused and sorrowful deliberation King Juda announced that "if the United States government and the scientists of the world want to use our island and atoll for furthering development, which with God's blessing will result in kindness and benefit to all mankind, my people will be pleased to go elsewhere" (Niedenthal, 1997: 29). In reality though the inhabitants of Bikini Island felt they had no choice in this matter because thousands of soldiers and scientists had already occupied the Atoll and hundreds of airplanes and ships littered their lagoon (Keju-Johnson, 1998). The Bikinians were promised that the United States only wanted to use their islands for an undetermined 'short time' (Keju-Johnson, 1998; Bertell, 1985). The Bikini residents had no conception of the permanent displacement, suffering, and illness that they would face; they had no idea that they would be the direct targets of the nuclear test assault waged by the U.S. military in their region.

While the 167 residents of Bikini were preparing for their exodus to Rongerik Atoll preparations for the Nuclear Test War advanced rapidly. In addition to the already established military presence at Bikini, approximately 250 naval ships, 156 aircraft, 25,000 radiation recording devices, the Navy's 5,400 experimental rats, goats, and pigs, and 42,000 military and scientific personnel began to arrive for the first nuclear test operation in the area, 'Operation Crossroads' (Niedenthal, 1997; Wiesgall, 1994). The first two atomic blasts of the reported twenty-four that occurred at Bikini Atoll, deemed

‘Operation Crossroads’ by the Navy, were called ‘Able’ and ‘Baker’ and were about the size of the nuclear bomb dropped on Nagasaki, Japan (Salvador, 2002; RMI Embassy-USA, 2002). ‘Able’ was an atmospheric nuclear detonation, while ‘Baker’ was an underwater nuclear detonation (Wiesgall, 1994). ‘Operation Castle’ followed in 1954 and consisted of six detonations at Bikini with ‘Bravo’ being the most powerful thermonuclear detonation recorded by the U.S. (U.S. DOE, 1994; IPPNW, 1991). ‘Operation Redwing’ commenced in 1956 and comprised another six nuclear explosions at Bikini (U.S. DOE, 1994; IPPNW, 1991). The Nuclear Test War at Bikini concluded in 1958 with ‘Operation Hardtack I’ and the final ten nuclear detonations reported (RMI Embassy-USA, 2002; U.S. DOE, 1994).

Meanwhile approximately 125 miles east of Bikini at Rongerik Atoll, a small sandbar island with limited vegetation and a surrounding ocean that contained mostly poisoned fish, the displaced Bikinian population struggled to survive (Niedenthal 1997; Thomas, 1995; Bertell, 1985). Rongerik Atoll is one-sixth the size of Bikini; its 17 islands comprise 0.63 square miles compared to Bikini’s 36 islands and 2.3 square miles, and its lagoon is less than one-fourth the size of Bikini’s (Niedenthal, 2001). In addition, the life-sustaining coconut palm and pandanus trees on Rongerik produced considerably less yields than at Bikini (Niedenthal, 1997). Keju-Johnson’s description of Rongerik presents a compelling account of the hardships faced; “There are no resources on it [Rongerik]. It was too poor to feed the people. We live on our oceans – it’s like our supermarket – and from our land we get bread-fruit and other foods. But on Rongerik there was nothing” (Keju-Johnson, 1998: 15). This was absolutely devastating for these formerly self-sufficient people because they soon realized that the coconut trees and other

local food crops produced very few fruits compared to their ancestral homeland, Bikini Atoll (Niedenthal, 2001).

The U.S. Navy provided food sufficient only for a few weeks and then left them stranded for a year, even though only two months after their forced migration the Bikinians initiated a request to return to their homeland (Niedenthal, 1997; Seager, 1993). A U.S. doctor who visited the Bikinians at Rongerik in July 1947 reported that they were visibly suffering from malnutrition, while six months later another medical officer reported that they were starving (Weisgall, 1994; Weisgall, 1980). Rongerik was simply not capable of providing their sustenance needs; the people were forced to ration themselves to one bucket of water per household each day, and were cutting down young palm trees at the heart of the palm because there was nothing else for them to eat (Weisgall, 1994). It was not until March 1948 that the U.S. Navy acknowledged the severity of the situation at Rongerik; prior to this time they were more concerned with promoting a campaign to assure the public that the Bikinians were actually going to be much better off at Rongerik (Weisgall, 1994).³¹

The plight of the Bikinians could not be ignored indefinitely and in March 1948 they were moved to a temporary camp, a strip of grass next to the airport, on Kwajalein Atoll until they could decide where to live (Niedenthal, 1997; Weisgall, 1980).³² In June

31. For example, a retired Navy Admiral wrote in *Newsweek* that Bikini Atoll was unhealthy and produces little food besides coconut and fish, while Wyatt's chief of staff told reporters that the 'natives' believed that Rongerik was better than Bikini because it had more coconut, pandanus, and breadfruit trees. U.S. military authorities consistently sidelined the claims of the displaced Bikini population; a 1946 New York Times article quoted military officials saying they don't understand why they want to move because "Bikini and Rongerik look alike as two Idaho potatoes" (Weisgall, 1994: 309). See Jonathan Weisgall, *Operation Crossroads: The Atomic Tests at Bikini Atoll* (Annapolis, Maryland: Naval Institute Press, 1994), 308-316.

32. Although it must be noted that it was the leak of the Navy board's report to newspaper columnist Harold Ickes, who wrote an article to inform the American, and international community of the horrific situation facing Bikinians that prompted Navy action to move the Bikini Islanders to Kwajalein. He wrote:

1948, the Bikinians chose to live at Kili, an uninhabited island in the southern Marshalls. Kili is an island not an atoll, and it is one-third a square mile in land area with no lagoon (i.e. a sheltered fishing ground). In contrast, Bikini Atoll had 23 islands that form a calm lagoon with a land area of 3.4 square miles (Weisgall, 1994; Weisgall, 1980). Life on Kili has been difficult physically and psychologically for Bikinians. An unprotected lagoon means that Kili is surrounded by 10 to 20 foot waves; islanders are denied the opportunity to fish and sail their canoes, and the island is virtually inaccessible from November to May (Niedenthal, 1997). Starvation ensued as the Bikinians could not meet their subsistence needs while U.S. food supplies continued to be inconsistent and unreliable. The psychological toll for Bikinians has been as great as the physical deprivation. One Bikinian residing on Kili lamented: "At Bikini, one could always go to another island, but here it's always the same. Sleep, wake up, Kili. Sleep, wake up, Kili. Again sleep, wake up, Kili. Kili is a prison" (Weisgall, 1980: 83). Bikinians longed for their homeland and gained hope for the first time in 21 years of the possibility to return.

In 1967 an ad-hoc committee appointed by the Atomic Energy Commission (AEC) reviewed a radiological survey of Bikini and declared the Atoll safe for human habitation, and therefore resettlement of the displaced Bikinians (de Ishtar, 1994; Bertell, 1985). The Bikinians were elated with the news that they could at last return to their ancestral homeland and subsistence living. Elation immediately was replaced by shock and sorrow once they witnessed the magnitude of devastation at their homeland. In some areas the coconut trees were completely decimated and only scrub vegetation remained, while areas closer to the bomb detonation sites were like deserts (Weisgall, 1980). It was

"the natives are actually and literally dying of starvation (and) ... he compared the assiduous care that the Navy has bestowed upon its experimental animals with its treatment of the Islanders" (Weisgall, 1994:

most shocking for the Islanders to witness the complete eradication of some of their islands from the Nuclear Test War, Bikinians wept openly as they declared that their islands had “lost their bones” (Bertell, 1985: 74). Despite assurances that Bikini was ‘safe’ by AEC ‘experts’ and Navy officials responsible for conducting radiological surveys, there was increasing recognition that a more thorough investigation and analysis was required (RMI Embassy-USA, 2002; Weisgall, 1980).

‘Clean-up’ efforts were completed in 1972 and re-settlement of Bikini continued, but it was not until 1975 that radiological studies contradicted claims of ‘safety’ for Islanders (Niedenthal, 1997; RMI Embassy-USA, 2002).³³ By 1978 U.S. scientists conceded that Bikinian’s had alarmingly high levels of internal radiation from consuming locally grown foods. It was revealed that the “Bikinian’s blood carried a 75 percent increase in cesium 137, the highest level of cesium 137 in any population” (de Ishtar, 1994: 24). In August 1978 U.S. ships once again entered the Bikini lagoon to return the re-settled population to Kili, and their hopes of return were completely obliterated as Bikini was deemed uninhabitable for at least 30,000 years (Keju-Johnson, 1998).

To make matters worse the Bikini Islanders suspect that they were only moved back to Bikini so that U.S. scientists would have human subjects in their military-driven search to measure the long-term effects of radiation exposure. A 1976 Department of Energy (DOE) study concluded:

312). See Weisgall, *Operation Crossroads*, 308-312.

33. The ‘clean-up’ effort entailed the removal of radioactive debris from the Atoll, removal of 5 inches of topsoil, replanting of coconut trees, and housing development. Yet, the U.S. military emphasized that the program to restore the contaminated Atoll was designed not to interfere with the maintenance of the test readiness posture, especially Safeguard C, which is the contingency plan to resume atmospheric testing in the Pacific. Although it is not clear how this affected the ‘clean-up’ effort, it is clear that the military had other goals that took primacy (for example the opportunity to practice deployment of forces). See International Physicians for the Prevention of Nuclear War, *Radioactive Heaven and Earth*, 79-88.

“Bikini Atoll may be the only global source of data on humans where intake via ingestion is thought to contribute the major fraction of plutonium body burden ... It is possibly the best available source of data for evaluating the transfer of plutonium across the gut wall after being incorporated into biological systems” (Wiesgall, 1980: 90).

As expected, DOE vehemently denies allegations of intentionally exposing the Islanders to radioactive contamination in order to study how people absorb radioactivity, yet at the very least their negligence and ignorance is blatant. The Bikini Islander’s suspicions are well founded upon examination of AEC’s decision-making process that resulted in the re-settlement of Bikini.

In 1968 scientists were familiar with the risks associated with external radiation exposure, but external doses constituted only 10 to 15 percent of the Islanders’ total exposure (Niedenthal, 2001). The area of utmost importance to research at this time was the effects of internal radiation exposure, and one method to determine this was to re-settle Bikinians who would drink contaminated well-water and ingest food grown in radioactive soil (Weisgall, 1980). The AEC’s internal radiation dose assessment calculations were ludicrous; they predicted that the Bikinian’s entire daily intake of coconut meat and milk, the only liquid in their diet, would be nine grams, but in reality the daily dose was closer to 600 or 700 grams each day (Wiesgall, 1980). Whether the errors in AEC calculations and decision-making were the result of incompetence or reprehensible motivations for human test subjects is not easily resolved, and perhaps is a combination of both. As for Bikini Islanders their existence remains tenuous; over half of their population is living at Kili again while the remainder is scattered throughout the other atolls in the Marshall Islands (Niedenthal, 2001). Their hope for a peaceful future endures while the region’s foreign policy remains completely in line with American military and economic interests.

Although the U.S. government moved the Marshallese from Bikini and Eniwetok in the mid-1940s when the Nuclear Test War began, they did not warn any island inhabitants when the largest bomb ever recorded was detonated only two meters above the ground from a tower at Bikini Atoll (Warner & Kirchmann, 2000; Dibblin, 1989; Bedford, 1986). In 1954 Bikini Island was bombed with 17 million tons of radioactive explosives; a 17-megaton hydrogen bomb code named "Bravo" (Thomas, 1995; IPPNW, 1991). This bomb was at least 1,300 times the destructive force of the bomb dropped at Hiroshima, was specifically designed to create a vast amount of lethal fallout, and has contributed to the magnitude of radioactive contamination that has left most of the Atoll uninhabitable for at least 30,000 years (Eknilang, 1998; Keju-Johnson, 1998; IPPNW, 1991).

The bomb's cloud rose 40 kilometers immediately and after 10 minutes had a diameter of over 120 kilometers (IPPNW, 1991). The U.S. military maintains that an unexpected wind shear condition resulted in heavy fallout eastward rather than over open seas to the north. Yet, their own records report that seven hours before detonation winds at 10,000 to 25,000-foot levels were heading east toward Rongelap (RMI Embassy-USA, 2002).³⁴ Despite weather reports that the winds were blowing in the direction of inhabited islands, the detonation of 'Bravo' charged ahead (WWNFIP, 1987). The suspicions that the military deliberately exposed the residents on neighboring islands in order to establish a group of human subjects for their research regarding the long term

³⁴ In addition to the military's own records, Dennis O'Rourke conducted interviews for his film 'Half Life' with American servicemen responsible for monitoring the weather at nearby Rongerik prior to nuclear explosions at both Bikini and Eniwetok. The men he interviewed claimed that the 'Bravo' test was deliberately carried out despite winds blowing east toward inhabited islands: "The winds had been blowing straight at us for days before the test. It was blowing straight at us during the test and straight at us after it. The wind never shifted" (WWNFIP, 1987: 32-33). See Women Working for a Nuclear Free and Independent Pacific, 30-40.

health effects of radiation exposure are well corroborated, especially in relationship to internally ingested radioactivity (Nussbaum & Kohnlein, 1995; de Ishtar, 1994; Bertell, 1985).

Six of the islands were completely decimated from this nuclear pillage at Bikini Atoll, while fourteen are left uninhabitable (de Ishtar, 1994; WWNFIP, 1987). The islands, or pieces of the coral reef, were 'vaporized' according militarized, normalized representations of such despicable events (Cohn, 1987). This nuclear detonation of 'Bravo' alone has scarred the northern Marshall Islands with the legacy of being one of the most contaminated areas in the world (Nussbaum & Kohnlein, 1995; IPPNW, 1991). The intense radioactive fallout severely contaminated at least 300 people immediately; 23 men on a Japanese fishing boat (*5th Lucky Dragon*), 28 American servicemen at Rongerik Atoll, 167 people at Utirik, 64 inhabitants of Rongelap, and another 18 Rongelapese who were fishing at the nearby Ailingnae Atoll (Warner & Kirchmann, 2000, Thomas, 1995).³⁵ Yet, since the U.S. military consistently withholds information about their lethal activities it is not surprising that a DOE study published in 1982 revealed that the fallout went beyond their earlier admissions. "There are eleven other atolls or single islands that received intermediate range fallout from one or more of the megaton range tests. A number of these atolls are presently inhabited while others are used for food collection" (Dibblin, 1988: 29).

Approximately four to six hours after the detonation Rongelap, located about 200 km eastward of Bikini, was bombarded with intense radioactive fallout. A radioactive

35. My analysis here will be limited to some of the effects of the radioactive fallout for the people of Rongelap, and it is again only partial since the history is extremely rich and complex.

cloud rained particulate, ash-like material on Rongelap. Lijon Eknilang, eight years old when 'Bravo' was detonated, recounts the war zone that ensued:

"A little later in the morning we saw a big cloud moving to our islands. It covered the sky. Then it began to snow in Rongelap. We had heard of snow from the missionaries, and other westerners who had come to our islands, but this was the first time we saw white particles fall from the sky and cover our island. For many hours poison from the bomb kept falling on our islands. We kids were playing in the powder, but later everyone was sick and we couldn't do anything." (Eknilang, 1998: 21).

It was not long before the Rongelapese people felt the negative effects of the white powder that rained on their Atoll and exposed them to lethal amounts of radiation, a word that they came to understand as the 'poison'. Also the people of Rongelap were not evacuated until two and one-half days after the explosion of 'Bravo' thereby prolonging their exposure to the intense amounts of radioactive contamination (Warner & Kirchmann, 2000). At the same time nearby Navy ships had instructions only to measure the intensity of radioactivity and not to rescue the island inhabitants (Dibblin, 1988). In addition, on the evening of the second day a seaplane from Eniwetok arrived with two men who brought what Rongelapese described as 'strange machines', but they only stayed for twenty minutes to take some readings of water catchments and soil (Dibblin, 1988). Although these strange occurrences were not immediately understood, the Rongelapese came to understand that they were pawns in the nuclear assault the U.S. military waged against their land and their people.

Rongelapese were exposed to deeply penetrating whole-body gamma irradiation, to internal radiation emitters inhaled or swallowed, and to direct radiation debris (Nussbaum & Kohnlein, 1995; IPPNW, 1991). The exact dose of radiation that the Islanders were exposed to was never measured, but estimates average 200 rem (IPPNW,

1991; Dibblin, 1988).³⁶ The International Commission on Radiological Protection (ICRP) recommends a maximum permissible total body dose of 0.1 rem per year (Busby et al., 1999). Whereas, other scientists argue that no level of radiation is safe or acceptable since even low doses of radiation pose a significant threat.³⁷ Also scientists note that as we learn more about nuclear radiation safety levels have necessarily been reduced (Gonclaves, 2001; Busby et al., 1999).³⁸

The negative health and environmental implications from this powerful nuclear explosion were both immediate and long lasting. Initially the Islanders were overcome with acute radiation sickness; this entailed severe bouts of vomiting, diarrhea, skin rashes and inflammation, and hair loss (Keju-Johnson, 1998; McIvor & Lifton, 1992).³⁹ Lijon Eknilang describes her experiences on Rongelap during the time before her people were evacuated to Kwajalein:

“Late in the afternoon I became very sick, like I would throw up, and I had a bad headache. The other people on the islands experienced the same problems. Towards the evening our skin began to burn like we had been out in the hot sun all day. The next day our problems got worse. Big burns began spreading all over our legs, arms and feet and they hurt very much. Many of us lost our hair. ... The fall-out that our bodies were exposed to caused the blisters and sores we experienced over the weeks that followed. The serious internal and external exposure we received

36. Rem is a unit of dose that takes into account the relative biological damage due to various kinds of radiation energy absorbed by tissue. See International Physicians for the Prevention of Nuclear War, *Radioactive Heaven and Earth*, 159-171.

37. The threat posed by low doses of radiation is evident in the experiences of the people of Utirik Island who experienced the radioactive fallout as an invisible mist about 20 hours after the detonation of ‘Bravo’. Although the estimated amount of whole-body exposure for these islanders was 14 rems, compared to 200 rems for the people of Rongelap, they have experienced similar health problems such as tumor growth in their thyroids and birth defects. See Frederick Warner, & Rene Kirchmann, *Nuclear Test Explosions: Environmental and Human Impacts* (New York: John Wiley & Sons, 2000), 127-131.

38. The ‘acceptable’ level of radiation exposure established by the ICRP has been reduced six times since 1931, and is now more than 36 times lower than it was then. See Eduardo Gonclaves, “The Secret Nuclear War,” *The Ecologist* 31 (April 2001), 30-33. Also see Chris Busby et al., “Poisoning in the name of progress,” *The Ecologist* 29 (November 1999), 396.

39. The International Physicians for the Prevention of Nuclear War note that nausea, vomiting, and diarrhea are caused by radiation damage to mucosal cells lining the gastrointestinal tract. See International Physicians for the Prevention of Nuclear War, *Last Aid: The Medical Dimensions of Nuclear War* (San Francisco: W.H. Freeman and Company, 1981), 60.

caused long-term health problems that affected my parents' generation, my generation, and the generation of my children" (Eknilang, 1998: 22).⁴⁰

The blisters, sores, hair loss and other symptoms of acute radiation sickness eventually cleared up, but by the early 1960s a set of serious illnesses previously unknown on Rongelap emerged (de Ishtar, 1994; McIvor & Lifton, 1992; Bertell, 1985). The most disturbing and terrifying effects included a host of thyroid conditions, the growth of cancerous tumors, and reproductive problems (McIvor & Lifton, 1992; Bertell, 1985).⁴¹ Although there are many questions unanswered about the negative health legacy of Rongelapese people since the detonation of 'Bravo', the Islanders point out two certainties. First, ever since their exposure to the radioactive fallout in March of 1954 they have developed a host of previously unknown diseases; and second, the majority of casualties have been children (McIvor & Lifton, 1992).

John Anjain, the village headman of Rongelap at the time of 'Bravo's' detonation, began to keep a record of the health problems that emerged among his people nine years after the bomb. His notebook contained a list of eighty-six names: sixty-three people

40. It was two and one-half days when the people of Rongelap were finally moved from their island to Kwajalein where for three months they received treatment and were monitored by American medical officials. For three years they led an uncertain and unsettled existence as they were shunted around to different islands (Ebeye and then Ejit on Majuro Atoll) until they were told they could return to their homeland. U.S. officials deemed Rongelap 'safe' for habitation in 1957, yet when the people returned they ingested the poison and contamination that remained. The food that they had eaten for centuries prior to the nuclear explosion, fish arrowroot and coconuts, burned their lips to the point of bleeding, gave them stomach aches, and made them nauseous. In 1985 they sought the help of the international community to move them from their contaminated land, and Greenpeace responded. They now live on Mejato, an island on Kwajalein Atoll, where they suffer due to a lack of food and the 'poison' that lingers in their bodies and in the bodies of their future generations. See Lijon Eknilang, "Learning From Rongelap's Pain," Zohl de Ishtar, *Pacific Women Speak Out for Independence and Denuclearization* (Christchurch, New Zealand: Raven Press, 1998), 21-26.

41. Medical examinations carried out in the early 1970s for the Rongelapese who were exposed to radioactive fallout indicated a higher than average incidence of many more health complications. These included: acne, anemia, arteriosclerosis, bradycardia (usually slow heart pulse), cervical erosion, urinary tract or intestinal hernia, leprosy, migraine, rheumatic heart disease, malignant and benign tumors. In addition, the incidence of diabetes in the islands has been found to be the highest in the world, with the

living on Rongelap, nineteen living on nearby Ailinginae during the Nuclear Test War, and four babies born after the Test War (Eknilang, 1998; McIvor & Lifton, 1992). Anjain tracked the deaths after the Nuclear Test War as well as those who had to have thyroid operations; sixty-two of the islanders have either died or suffered serious long-lasting effects from the radiation exposure (McIvor & Lifton, 1992). Among the dead was Anjain's son, Lekjoi who died of leukemia at the age of nineteen.

“In a broken voice Anjain recalled his son toddling around as a boy, chuckling gleefully while the ashes fell ... [Anjain also spoke of a] tragic case of one woman for whom an operation had come too late. Her swollen throat burst and she vomited blood and a bluish substance before dying in great pain” (McIvor & Lifton, 1992: 132).

The repeated denials by U.S. officials that the deaths and health complications they have experienced are not linked to the radioactive fallout from the Nuclear Test War are not in the least believable to the Marshallese as they continue to count their casualties, those with health problems, their deformed children, and as they suffer the loss of their homeland which was everything to them – food, medicine, shelter, and the spirit of their ancestors (Eknilang, 1998; de Ishtar, 1994).

Thyroid problems appeared because the radioactive material iodine-131, released into the atmosphere from the nuclear explosion, was absorbed and became lodged into people's thyroids where it destroyed the ability of that gland to excrete the growth hormone (Bertell, 1985). A Brookhaven National Laboratory report published in 1981 that 9.1 percent of adults living on Rongelap experienced thyroid problems, and seventeen of the twenty-two of the Islanders who were under 10 at the time of the

possible exception of certain American Indian groups. See Rosalie Bertell, *No Immediate Danger: Prognosis for a Radioactive Earth* (Toronto, ON: The Women's Press, 1985), 70-76.

detonation have thyroid conditions (McIvor & Lifton, 1992).⁴² The only known method to counteract the ingestion of iodine-131 is to take potassium iodate tablets or eat uncontaminated foods high in iodine such as seaweed and miso either in advance or within hours of exposure (Dibblin, 1988). The Marshallese were not provided with this information or access to an antidote. The permissible radiation dose to the thyroid in one week is marked at 0.3 rems, and the children of Rongelap under 10 years of age received a dose between 500 and 1,400 rems which is the equivalent of 1000 to 2000 times more than the permissible dose (Dibblin, 1988).

The effect of radiation contamination on women's reproductive systems and unborn children has been disturbing and terrifying. The Marshallese report gross changes in their offspring since the radioactive fallout littered their Atoll. The first five years after the exposure to radioactive fallout Rongelapese women experienced sterility, after which there was a significant increase in miscarriages, stillbirths, and severely deformed babies (Yablokov, 2002; Bertell et al., 1999). Some radionuclides are retained in bone or fatty tissues, and they are able to cross the placenta barrier to disrupt the developing embryo or fetus (Bertell et al., 1999). The most common birth defects on Rongelap and other atolls caught in the crossfire of the Nuclear Test War have been 'jellyfish babies'. Darlene Keju-Johnson explains:

42. It should be noted that Brookhaven Laboratory has been criticized for its lack of independence from the Department of Energy. Johnsay Riklon, a Rongelapese lawyer now living on Ebeye, suggests that Brookhaven analyzing radiation residuals at Rongelap is equivalent to R.J. Reynolds Tobacco Company being commissioned to study the relationship between cigarette smoking and lung cancer. The Islanders consistently express their dissatisfaction with the Brookhaven programme and the medical officials associated with it. They sense that they are merely 'guinea pig subjects' for the advancement of military-scientific research, they are not honestly informed of the nature of their problems, denied access to their own health records, and sent away for treatment and surgical procedures without an interpreter or explanation of what would happen. As one tries to explain the horrific treatment of the Rongelapese the theories of incompetence or conspiracy emerge, and again perhaps it seems a combination of both. See Dibblin, 65-79.

"These babies are born like jellyfish. They have no eyes. They have no heads. They have no arms. They have no legs. They do not shape like human beings at all. But they are being born on the labour table. The most colourful, ugly things you have ever seen. Some of them have hairs on them. And they breathe. This ugly thing lives for only a few hours. When they die they are buried right away. They do not allow the mother to see this kind of baby because she will go crazy." (WWNFIP, 1987: 8).

Foreign officials have maintained that these babies born with no bones and transparent skin that resemble a strand of purple grapes cannot be linked with radiation poisoning, but the Marshallese know otherwise (Eknilang, 1998). The Islanders have formed anti-nuclear networks to mount resistance against the U.S. military assault of their land and people. In the process they have learned of other women's health and reproductive problems, even women from islands that the U.S. military has not admitted received radioactive fallout from their Nuclear Test War. Lijon Eknilang, a child who played in the radioactive 'snow' dumped on Rongelap, has been a contributing member of a women's activist group called Women Working for a Nuclear Free and Independent Pacific. She reveals the extent of her health problems; she has had seven miscarriages, lumps in her breasts, problems with her kidneys and stomach, thyroid surgery to remove tumors, and persistent blurred eyesight (Eknilang, 1998). She also reveals that she is not an anomaly in the militarized Pacific;

"One woman on Likiep gave birth to a child with two heads. There is a young girl on Ailuk today with no knees, three toes on each foot and a missing arm. Her mother had not been born by 1954, but she was raised on a contaminated atoll. Other children are born who will never recognize this world or their own parents. They just lie there with crooked arms and legs and never speak." (Eknilang, 1998: 24).

The United Nations reported that at least 150,000 Pacific Islanders have died from nuclear testing, thereby corroborating the claim that the brunt of the Nuclear Test War has been borne by indigenous peoples worldwide (Thomas, 1995). Yet, we are all vulnerable to the continuous fallout from the millions of tons of radioactive debris that

has been released into the earth's atmosphere, and therefore we must stand in solidarity with indigenous peoples worldwide to abolish the madness of nuclear weapons production and testing (Thomas, 1995). Gonclaves notes that "the world's population is still being subjected to the continuous fallout of the [approximate] 170 megatons of long-lived nuclear fission products blasted into the atmosphere and returned daily to the earth by wind and rain" (Gonclaves, 2001: 30). Our bodies are slowly being poisoned through the air we breathe, the food we eat, and the water we drink. By 1970 every single person on the planet had plutonium and strontium in their bodies (Busby et al., 1999). The increase in cancer rates, genomic instability and a plethora of other health problems is further complicated when attempting to consider the synergic effect between chemicals and radiation. Given the estimates that there are 1000 to 1500 new chemicals introduced into our ecosystem each year, the potential negative health complications are staggering (Busby et al., 1999).

Worldwide estimates of negative human health consequences from nuclear test explosions are phenomenal. An estimated 5 million newborns lost between 1956 and 1972, another 5 million babies born with mental retardation, 500 million stillbirths and miscarriages, 587 million babies born with fetal malformation, and 376 million cancers are all linked to atmospheric nuclear tests (Gonclaves, 2001; Yablokov, 2002; Bertell et al., 1999). During the second half of the twentieth century the total immediate genetic damage to humankind estimates at least 235 million genetic defects (Yablokov, 2002). Storms, floods, and earthquakes triggered by nuclear explosions have killed at least another two million people (Thomas, 1995).

The environmental consequences of the nuclear age are not only appalling, but also terrifying. The 'eternal' nature of radionuclides, for example plutonium or radioiodine, enter the ecosystem where they produce additional mutations in all living beings including viruses and microorganisms that science is not able to predict the implications of (Yablokov, 2002). The huge amounts of radioactive materials that have been dumped into our rivers and oceans has never received comprehensive study, but billions of curies of radioactive wastes have either seeped unsuspectingly or were purposely dumped into our water systems (Thomas, 1995). As noted in chapter one the drastic acidic shift in our atmosphere is directly linked to the countless beta particles injected into the air from nuclear explosions that interact with nitrogen, oxygen, and water vapor to produce nitrates and nitric acid (Thomas, 1995; Bertell, 1985). Chapter one also raised questions about underground nuclear explosions and tectonic upheavals (Whiteford, 1994). Gary Whiteford, a former NASA scientist, points to 'killer quakes' which immediately followed 16 nuclear tests. Whiteford theorizes that underground nuclear detonations transfer bundles of energy to sliding tectonic plates and encourage one plate to override another (Thomas, 1995; Whiteford, 1994).

Detonating nuclear weapons during times of 'peace' has been justified to ensure the infinite production of more sophisticated weapons that will deter the 'enemy' and promote 'peace'. Thousands of nuclear weapons have been detonated worldwide on indigenous people's lands to achieve 'peace', if we adopt the rhetoric of U.S. foreign policy and military officials. Furthermore, the potential 'sacrifice' of indigenous land and people is not only an acceptable risk in this pursuit, but most likely a requirement. Henry Kissinger's comment about Pacific Islanders presents a chilling view of how U.S.

military pursuits are privileged over certain human life: “There’s only 90,000 people out there. Who gives a damn” (WWNFIP, 1987: 6). I have referred to the U.S. nuclear testing program in the Marshall Islands as the Nuclear Test War throughout because the Islanders and their lands could not avoid the ‘crossfire’, but also have been directly targeted during this nuclear offensive.

What is the difference between nuclear explosions during war or times of ‘peace’? There are two main differences for the Marshallese; first they have been exposed to hundreds of nuclear detonations during ‘peace’, and second they were various distances away from ground zero of the nuclear bombs that were exploded and therefore did not suffer the magnitude of external radiation and incineration effects that the Japanese people of Hiroshima and Nagasaki did. Yet, this leads to an understanding of the motivation of the U.S. military to embark on their nuclear testing frenzy. The U.S. military already knew what the effects of incineration and external radiation were for human life because of the nuclear bombs they dropped near the end of WWII, but they wanted to know the long-term health implications of internally ingested radioactivity, and it was Pacific Islanders who served their twisted military-research desires. Throughout their history the Marshallese have promoted a culture of peace, harmony, respect, and cooperation. There is no word for ‘enemy’ in Marshallese. Their relationship to other people and their ecosystem stands opposite to the motivations of the U.S. military and initially prevented them from comprehending how their society could be so violently disrupted. Since nuclear war has been waged against them, the Marshallese are longer naïve about U.S. military motivations and actions. They continue to suffer from the effects of a nuclear war in the Pacific that was never declared, but has claimed many

casualties, contaminated land for generations, and produced horrific health consequences that no one dreamed possible. The Marshallese, like other Pacific Islanders, also continue to rail against the ongoing militarization of their ancestral lands in the hope that one day they can return to their cultural traditions which in reality exemplify how peace can truly be attained.

Chapter 3: Environmental and Civilian Wreckage Part II:

Rocky Mountain Arsenal

The current situation at Rocky Mountain Arsenal (RMA) illustrates that assessing the extent of toxic contamination due to military 'peace-time' activities just in the United States is a daunting, but important task. Rocky Mountain Arsenal stands as a tragic symbol of the nation's military toxic waste dilemma. It is simply one of the tens of thousands of sites on U.S. soil that reveals the paradox evident in maintaining readiness for war.⁴³ The military's claim to protect loses its persuasion upon examination of the vast contamination caused by decades of chemical, pesticide, and herbicide production at Rocky Mountain Arsenal. This site alone contains millions of gallons worth of toxic wastes generated from these manufacturing processes, and 'de-militarization' efforts.

The toxic wastes continue to migrate away from their 'containment' pits, and in the process are contaminating the air, water sources and the soil necessary for life sustenance. As for the costs associated with an attempted 'clean-up', they are not only staggering (estimates start from hundreds of billions), but they continue to increase each year that passes. What is worse, some of the damage is irrevocable. The 'national sacrifice' zones, areas that must simply be fenced-off and left uninhabited because of the magnitude of contamination, are evidence of this. My analysis of Rocky Mountain Arsenal demonstrates that the U.S. military is not able to reconcile the fact that they are poisoning citizens and their systems of life sustenance in the pursuit of 'national security'.

An examination of the historical and current ecological nightmare at the Arsenal exposes the paradox in military logic regarding citizen protection. In the pursuit of 'protecting' their citizens the U.S. military has contaminated their water sources and agricultural lands, as well as exposing them to millions of pounds of nerve agents that require only a freckle-size amount to kill. In this chapter, I begin by detailing the history of the Rocky Mountain Arsenal near Denver, Colorado to illuminate some of the factors that have contributed to its current ecological nightmare. I briefly outline RMA's production activities beginning in 1942 when it first opened, until 1982 when production ceased. I also detail some of the manufacturing processes that occurred at RMA, types of chemical, pesticides, and herbicides produced, as well as some of the key physical features of RMA where production was taking place. This brief historical description helps to provide insight into the lethal 'peace-time' processes that have contributed to the current predicament at the Arsenal.

My analysis then shifts to the methods of waste disposal employed at RMA. I consider two levels of analysis related to the lethal waste generated at the Arsenal; toxic waste generated from the production processes, and toxic waste generated in 'demilitarization' efforts, military terminology for the attempted disposal of the various weapons produced. The Army's standard practices of disposing millions of gallons of lethal chemicals over 40 years are not only appallingly neglectful of the environmental (and therefore inevitably human) consequences, but such practices must be conceived of as a direct and deliberate assault. The toll of contamination from decades of lethal

43. As of 1999, 28,000 sites on approximately 1,900 military installations have been identified as toxic 'problems'. See GAO-02-103 *Defense Environmental Issues: Improved Guidance Needed for Reporting on Recovered Clean-up Costs* (United States General Accounting Office, October 2001), 3.

chemical production finally was acknowledged in 1987 by the federal government and this site was placed on a National Priorities List, Superfund, for environmental clean-up.

Although the entire chapter could be dedicated to the legal and political complexity of this aspect of RMA's history, I provide only a basic sketch of how this designation immediately caused a politically-charged flurry of litigation and denials by the primary polluters at the site, the U.S. Army and Shell Chemical Corporation. This translated into excessive costs due to litigation and management activities (for example initial impact studies), while the actual attempted clean-up was delayed. The clean-up efforts began in 1988 and the Army has been boasting of their 'milestone' environmental achievements ever since, but citizen groups have challenged the Army again and again to expose the *real* story at the Arsenal.

The *real* story entails a much more sobering reality of a significant amount of environmental wreckage beyond repair, and the Army's emphatic denial of any negative implications for the ecosystem and its inhabitants. One key certainty for everyone involved is a paucity of information; the volume of hazardous material is unknown, there are no known methods to completely eliminate the voluminous amounts of lethal, chemical-ridden waste, and there are limitations in current knowledge about the effects on the ecosystem and life from these chemicals. This situation is fully exploited by the Army and Shell to refute dissident concerns. They maintain a posture that "none of the health studies conducted thus far have shown an association between exposure to RMA contaminants and harmful health effects" (ATSDR, 1996: 3). Yet, another key certainty literally surfaces; lethal chemicals continue to appear in water systems and surface off the

RMA site in the soil in concentrations hundreds of times greater than is considered to be 'safe'.

In May of 1942, the U.S. Department of War announced their purchase of 19,883 acres of prairie farmland just eight miles northeast of Denver, Colorado and directly adjacent to the communities of Commerce City, Montebello, and rural Adams County (U.S. GAO, 1996). Their intention was to utilize this land for a military installation which would manufacture chemical and conventional weapons, as well as test their destructive effectiveness. Major General William Porter, chief of the Chemical Warfare Service at Rocky Mountain Arsenal argues: "It is fully recognized that the best insurance against an attack by chemical agents lies not only in gas masks and protective clothing, but also in the ability to retaliate immediately" (RVPRO-history, 2002: 4). Rocky Mountain Arsenal's manufacture of chemical weapons, 'demilitarization' of 'obsolete' chemical and conventional munitions, and test firing of smoke and high explosive mortar rounds exemplified the strategic goals of the U.S. and enabled the Army to produce more weapons than their 'enemies' in an effort to deter them. Yet, who are the U.S.'s 'enemies'? During the productive years at the Arsenal the Army claimed it was the 'communist threat', but since the ecosystem and all its inhabitants have borne the brunt of the assault, it seems that they are the real enemies.

From the beginning the three prominent chemicals produced at RMA were mustard gas, lewisite, and chlorine gas (RVPRO-history, 2002; Maret, 2002).⁴⁴ The

44. Mustard gas and lewisite, both blister agents, were designed to inflict casualties, restrict the use of terrain, and slow troop movement. Chlorine gas, a choking agent, causes damage to the respiratory tract and may cause death due to a lack of oxygen. See Karlheinz Lohs, and Thomas Stock, "Characteristics of chemical warfare agents and toxic armament wastes," Karlheinz Lohs and Thomas Stock, *The Challenge of Old Chemical Munitions and Toxic Armament Wastes* (Stockholm International Peace Research Institute: Oxford University Press, 1997), 15-34.

Arsenal was also responsible for producing varied conventional munitions, including incendiary bombs. During World War II (WWII) the Arsenal produced napalm fire-bombs, an explosive mix of jellied gasoline, and manufactured more than 100,000 tons of incendiary munitions (Gascayne, 1993). The inauguration of the Cold War and the fierce competitiveness between Soviet and American ‘superpowers’ for world domination, justified a chemical weapons build-up at RMA during the 1950s.

In the 1950s the Arsenal was praised by the Army as being capable of turning out “millions of incendiary bombs a year when operating at full capacity” (RVPRO-history, 2002: 7). During the Korean War, RMA manufactured white phosphorous-filled munitions, artillery shells filled with distilled mustard, and incendiary cluster bombs (RVPRO-history, 2002). After the Korean War, according to U.S. officials “the Soviet threat to world peace could hardly be ignored” (RVPRO-history, 2002: 7), and therefore the U.S. Army worked round the clock, seven days a week at the North Plants to produce these deadly chemical weapons. Between 1953 and 1957 RMA was deemed the premiere site for the ‘free’ world’s production of GB, or sarin, nerve gas, and the production of GB nerve agent continued throughout the 1960s (Green, 2002).⁴⁵

The Soviet launch of ‘Sputnik’ in October 1957 prompted U.S. research pursuits of a “secret super-fuel to give U.S. bombers a hypersonic push and power rockets to space” (RVPRO-history, 2002: 8). Therefore, a portion of Rocky Mountain Arsenal was utilized by the U.S. Air Force for the manufacture of rocket fuel. During the 1960s a significant portion of the Arsenal’s production efforts were dedicated to the development of powerful rocket propellants. The ‘Apollo 11’ flight to the moon in 1969 was powered

by the production from the Arsenal's hydrazine (RVPRO-history, 2002). Citizens had concerns about the environmental, human, and animal health consequences of the production of nerve gases and rocket fuels, and the enormity of its toxic waste generation from the inception of the Arsenal, but it was sidelined by policy makers in favor of stockpiling for military preparedness. According to U.S. military records, the philosophy that drove policy was 'how much do they have and how much must we have to serve as an effective deterrent' (RVPRO-history, 2002).

The Army's production of deadly chemicals was accompanied by toxic production of pesticides and herbicides by private companies (Maret, 2002; Wiley and Rhodes, 1998). Colorado Fuel and Iron Company manufactured a motley crew of industrial chemicals such as chlorinated benzenes, chlorine, naphthalene, caustic, and dichlorodiphenyltrichloroethane (DDT) between 1946 and 1946 (Wiley and Rhodes, 1998). Julius Hyman and Company produced pesticides and herbicides at the Arsenal between 1947 and 1952, at which time Shell Chemical Company acquired Hyman and continued production until 1982 (Shannon, 2002; U.S. GAO, 1996; U.S. GAO, 1986). Shell's toxic production included the manufacture of aldrin, dieldrin, dibromochloropropane (DBCP), malathion, parathion, DDT, endrin, isodrin, vapone, and hydrocarbons (U.S. EPA, 2002; Maret, 2002; Gascayne, 1993). These private companies dumped these chemicals, as well as many others not mentioned, into the open pits that the Army also used for the plethora of chemical waste they produced.

Some of the key physical features of the Arsenal include the former north and south chemical manufacturing complexes, toxic storage yards, numerous pits and

45. The nerve agent Sarin causes an increase in acetyl-chlorine in the body by blocking an enzyme called cholinesterase. The effect on skeletal muscles, sensory nerve endings, and central nervous system leads to

trenches, and a series of man-made lakes and basins for waste disposal (Maret, 2002; U.S. GAO, 1996). The North Plants facilities at RMA spanned 90 acres and consisted of 103 structures. The buildings accommodated chemical manufacturing and storage, as well as disposal systems (RVPRO-north plants, 2002). The primary function of the north plants facilities was to manufacture and fill munitions with GB, while its secondary function was to fill munitions with VX nerve agent and manufacture of anti-personnel devices (button bombs and micro-gravel mines).

The peak production period for GB was between 1953 and 1957, although the production capacity and exact amounts of Sarin produced during these years remain classified (RVPRO-north plants, 2002). The Army did disclose that in 1954 the Arsenal produced a total of 500,000 gallons of GB, which cost the American people 30 million dollars (Seagrave, 1981). From the 1950s to the 1970s the Army was attempting to improve both the stability and lethality of their chemical weapons stockpile. To accomplish this they engaged in activities such as: intermittent re-distillation of their chemical warfare stocks to produce a higher quality GB nerve agent, and replacing tributylamine, the stabilizer initially used in GB warfare production, with diisopropylcarbodiimide (di-c-di), which permitted the placement of GB into aluminum casings.⁴⁶

Building 1502 was the location for GB manufacture at the North Plant facilities while Building 1506, 1601, and 1606 were commissioned to fill munitions with the nerve agent. Bombs, bomblets, warheads, rockets, and artillery shells were all filled with GB at

death. See Karlheinz Lohs, and Thomas Stock, 15.

46. Distillation 'purifies' and stabilizes GB by passing it through a stripping column to remove residual isopropyl alcohol and hydrogen chloride. See Remediation Venture Public Relations Office, Historical Fact Sheet: North Plants Area (U.S. Army, February 2002), 1-2.

the North Plants (RVPRO-north plants, 2002). Army operations also included filling munitions with and storage of the organophosphorus nerve agent VX; manufacture of button bombs, which contain red phosphorus, potassium chlorate and glass; and the manufacture of micro-gravel bombs which contained glass, lead oxide, and cyclonite. By 1982 the facilities were no longer producing lethal chemical or conventional weaponry, but the toxic legacy from these destructive activities remains today with no prospects for adequate rehabilitation of the soils and water systems.⁴⁷

The South Plants facility, described by the U.S. Army as a 'state-of-the-art' chemical manufacturing facility, was located near the center of Rocky Mountain Arsenal. Between 1942 and 1968 the South Plants manufactured Lewisite and mustard gas; prepared incendiary mixes, and filled both incendiary and phosgene munitions (RVPRO-south plants, 2002). Originally, South Plants facilities were divided into the West Plants and East Plants and consisted of 295 structures. Within the West Plants, the '200 Series' buildings provided the site of the chlorine and caustic complex, and the '300 Series' buildings were the location of Army munitions filling (RVPRO-south plants, 2002). At the East Plants, the '400 and 500 Series' buildings were the location of early Army chemical agents manufacturing, incendiary munitions filling, and extensive pesticide production by Shell Chemical Company (RVPRO-south plants, 2002). East Plants also contained the 'South Tank Farm', a chemical storage facility; the '700 Series Buildings', known as the Incendiary Oil Bomb (IOB) plant, which was the site of napalm mixing and

47. The U.S. Government of Accounting Office reported that the Army estimated the costs of a clean-up would be between \$2.8 and \$3.6 billion and take until 2012. Yet, they maintain that costs and completion dates are subject to change since they have both consistently been extended. The Army also reports that in some areas restoration of the environment is simply not possible, and therefore they must 'sacrifice' the area. See U.S. GAO-02-103, 4-6.

incendiary munitions filling; and the 'Hydrazine Complex' which was the site for blending rocket fuel (RVPRO-south plants, 2002).

Lewisite was produced at South Plants from April 1943 until November 1943 when it was rendered obsolete due to the development of an effective antidote (RVPRO-south plants, 2002). All Lewisite process intermediates and additives, including acetylene, thionyl chloride, arsenic trichloride, sulfur monochloride, and mercuric chloride were produced at South Plants. Mustard, a chemical agent, was both manufactured and distilled to achieve greater potency and stability at South Plants from 1942 until the 1950s. Phosgene was purchased by the Army from commercial producers, transported to RMA's South Plants and used to fill 100 and 500-pound bombs. During WWII the preparation and filling of incendiary weapons comprised the most extensive Army operations at South Plants (RVPRO-south plants, 2002). Bombs were filled with napalm gel produced at East Plants; bombs and cluster bombs were filled with incendiary mixtures at West Plants; and white phosphorous, brought from offsite, was used to fill munitions igniters at East Plants. After WWII Army operations at the South Plants were as follows: filling of 105-mm shells, 4.2 inch mortar shells, and bombs with distilled mustard; re-working of incendiary bombs; filling of fire bomb igniters, grenades, and cups for incendiary bombs with white phosphorus; manufacture of button bombs; and the blending of rocket fuel for Titan missiles (RVPRO-south plants, 2002).

I have briefly outlined some of the production processes at the Arsenal since its inception in order to set the stage for an analysis of the magnitude of environmental wreckage that lingers from these very processes. The Army and private companies (although mainly Shell Chemical Company) are responsible for producing colossal

amounts of poisonous waste due to their ‘peace-time’ production activities at Rocky Mountain Arsenal (Lohs and Stock, 1997; Sutherland, 1997; Shulman, 1992; Seagrave, 1981). Millions of gallons of liquid waste were pumped into unlined depressions in the ground where they were left to evaporate, while solid wastes and munitions were buried in unlined holes (Shannon, 2002; Seagrave, 1981).⁴⁸ From 1942 through 1956 waste streams from manufacturing processes were discharged into unlined basins (A through E), while intermediate hollows were lined with lime in an effort to ‘neutralize’ the deadly chemicals (Shulman, 1992). The Army defends their actions by arguing that this was a ‘common industrial disposal practice’ for the time (RVPRO-history, 2002). A brief description of Basin A provides insight into the magnitude of toxic contamination that existed within all of these basins.

Basin A began as an unlined liquid waste disposal site that was approximately 123 acres in size and had a capacity of about 350 million gallons (Maret, 2002; U.S. EPA-fact, 2002). In 1942 and 1943 Basin A was filled with byproduct wastes from mustard and lewisite production. In the late 1940s it was the preferred site for liquid waste due to pesticide manufacturing operations, and in the 1950s liquid waste from Sarin production (Maret, 2002; Lanier-Graham, 1993; Shulman, 1992). On the east side of Basin A were the ‘Complex Trenches’; a favored site for the disposal of substances like VX, phosgene, white phosphorus, aldrin, chlorobenzene, cyanogens chloride, dichlor, endrin, and isodrin just to name a few of the 750 chemicals produced (Maret, 2002; U.S. GAO, 1996). The Army also utilized Basin A as a solid waste dump site for

48. Matthew Greene notes that accidents and spills, some running into the hundreds of thousands of gallons, also contributed to the contamination at Rocky Mountain Arsenal. My focus will not include such accidents and will be only on the intentional contamination of the site. See Matthew Greene, “The Rocky

their equipment contaminated with mustard, and ton storage containers for mustard (Maret, 2002). In 1957, wastes from Basin A were transferred to a new site, Basin F, because the amount of liquid wastes generated at the Arsenal exceeded the capacity of the reservoir (U.S. EPA-on-site, 2002).

The construction of Basin F, the deep well injection project, and a series of 'demilitarization' efforts constituted the Army's initial response to the complaints and evidence of 'off-post' contamination in 1951.⁴⁹ Basin F was designed and constructed as an evaporation basin to receive the unrelenting amounts of wastes generated from Rocky Mountain Arsenal's 'peace-time' activities, and to consolidate waste from the unlined basins (Wiley and Rhodes, 1998). Basin F had a surface area of about 93 acres and a capacity of approximately 243 million gallons (Lanier-Graham, 1993). It was constructed using a 3/8 inch-thick asphalt liner covered by a 1-foot-layer of sand and contained vitrified clay pipes with chemically sealed joints which transported liquid wastes to Basin F (Shannon, 2002; U.S. EPA-on-site, 2002).

Although the Army claims that this lined pond represented 'state-of-the-art' contamination control methods of the time (RVPRO-history, 2002), its failure to contain the toxic contamination was also admitted by the Army in the early 1960s (Greene, 2002). Despite the known faults and leakages plaguing Basin F, it remained the preferred dumpsite for liquid waste generated from both military and commercial activities

Mountain Arsenal: States' Rights and the Clean-up of Hazardous Waste," Working Paper 94-58 (http://www.colorado.edu/conflict/full_text_search/AllCRCDocs/94-58.htm), 1-3.

49. In 1951, farmers residing near Rocky Mountain Arsenal reported contamination in the soil (evident in damaged crops that year) and in their water wells, as well as unexplained illness in their livestock. The Army responded by constructing a 'state-of-the-art' basin to contain toxic waste and ensure that it would not migrate 'off-post'. Yet, Basin F failed to contain the wastes as promised by the Army and residents continued to complain of contaminated water and soils. See Karen B. Wiley & Steven J. Rhodes, "From weapons to wildlife: The transformation of the Rocky Mountain Arsenal," *Environment* 40 (June 1998), 4-5.

between 1957 and 1982 (U.S. EPA-on-site, 2002).⁵⁰ Basin F has been deemed one of the most toxic sites on American soil, and has earned Rocky Mountain Arsenal the designation of ‘the most toxic square mile on earth’ (Venkataramani, 1998; U.S. GAO, 1996; Thomas, 1995; Lanier-Graham, 1993; Shulman, 1992).

Until the early 1960s the Army emphatically denied that the plethora of lethal chemical by-product wastes generated at the Arsenal were in fact migrating away from the site and contaminating nearby agricultural soils, rural wells, and underground water aquifers (RVPRO-history, 2002). Nonetheless, civilian complaints throughout the 1950s that toxic chemicals were surfacing in their soil and water systems, failure of the ‘state-of-the-art’ technology at Basin F, and the recognition of their complete lack of control over toxic migration forced the Army to explore novel disposal initiatives.

The Pressure Injection Disposal Well program designed in 1961 and implemented in 1962 promised to permanently dispose of toxic waste generated at the Arsenal (Wiley and Rhodes, 1998; Seagrave, 1981). A hole was drilled 12,045-feet deep, or 2.5 miles, into the earth’s core just adjacent to Basin F in preparation for disposal of millions of gallons toxic sludge (Yelenick, 2002; Shannon, 2002, Ehrlich and Birks, 1991; Seagrave, 1981). From 1962 to 1963 waste by-products such as heavy metals, chlorides, wastewater, and toxic organics were pumped from Basin F into the well (RVPRO-well, 2002). In 1963 and 1964, noxious waste from Basin F was combined with sodium chloride waste from a pre-treatment plant, and also injected into the well (RVPRO-well, 2002). In four years approximately 165 million gallons of lethal waste was injected deep

50. Solid toxic waste continued to be disposed of in open pits and trenches that had no ‘protective’ lining. See EPA, On-site Incineration of Basin F Liquids at the Rocky Mountain Arsenal Superfund Site (EPA: February 12, 2002, <http://www.clu-in.org/products/costperf/incirtn/rocky.htm>), 140-141.

into the earth's core (Yelenick, 2002; Shannon, 2002). This was enough to fill a 50-acre lake to a depth of 10 feet (Birks, 1991).

The Army maintained that there was a minimal risk of the toxic fluids reaching the groundwater supply or surface soils since the injection point had 11,900 feet of rock above it, and was sealed (RVPRO-well, 2002). Yet, injecting poisonous waste deep into the earth was discontinued in 1966 because of its suspected connection to the 1500 earthquakes that occurred in Denver, an area not normally prone to earthquake activity, within these four years (Yelenick, 2002; Lanier-Graham, 1993; Seagrave, 1981).⁵¹ The deep well injection initiative, aimed at permanently eliminating millions of gallons of toxic derivatives generated at the Arsenal, failed miserably; the wastes were pumped back to the earth's surface and the Army returned to their previous method of 'surface impoundment'. The deep well injection project not only represents one of the Army's failed lethal waste disposal initiatives; it also exemplifies the resulting ecological devastation that that civilians had to face due to the Army's 'peace-time' activities. The claim of a 'threat' to national security from an 'external enemy' is exposed as ludicrous when compared to the *real* threat posed to citizens dependent upon water and soils for their sustenance near Rocky Mountain Arsenal's poisonous wasteland.

'Demilitarization' of chemical weapons constituted the bulk of the military's activity at the Arsenal in the 1970's, although they continued to produce chemical warfare agents and distil their stocks to improve their potency. The Army's terminology

51. Only one month after the pumping operations began, the Denver area was struck by its first earthquake in 80 years. It is suspected that the 1500 earthquakes over the next five years were caused by the lubrication of a previously inactive fault. The injected waste purportedly contributed to the shifting of underlying earthen plates, along a transform fault, triggering earthquakes measuring a magnitude of 5 to 5.5. See John W. Birks, "Weapons Forsworn: Chemical and Biological Weapons" in Anne H. Ehrlich and John W. Birks, *Hidden Dangers: Environmental Consequences of Preparing for War* (San Francisco:

for weapons disposal, 'demilitarization', is representative of their skill at manipulating language to normalize and obfuscate the nature of their activities (Cohn, 1987). 'Demilitarization' has not been a benign or trivial process as the Army implies. It has entailed extracting thousands of tons of lethal chemicals from explosive weapons in an attempt to dispose of them, and it has generated mountains of further toxic waste in the process (Lohs & Stock, 1997; Sutherland, 1997). The reality is that the old premixed nerve agent weapons were never designed to be 'demilitarized' in the first place (Seagrave, 1981). In the 1950s and 1960s, there was a mad dash to produce nerve agents for munitions and army officials did not once consider that one day the millions of unused bombs, rockets, land mines, and artillery rounds would have to be uncorked, emptied, and somehow disposed of (Seagrave, 1981).⁵²

The military typically only addresses potential environmental catastrophes when they can no longer be ignored; in other words the lethal agents they have produced literally surface through their leakages or breaches.⁵³ It was evident to the Army that the mustard gas stored at RMA required disposal, and therefore various methods were considered (Sutherland, 1997). The Army considered electrochemical, chemical, and

Sierra Club Books, 1991), 176. Also see John Yelenick, *Rocky Mountain Arsenal Restoration Advisory Board* (March 9, 2002), 2.

52. This is despite previous experience with chemical weapons dismantling and disposal. It has proved to be a significant problem since chemical warfare was used in World War I (WWI). Until 1969, agents and munitions were destroyed through open-pit burning, land burial, and ocean dumping, all of which have since been prohibited by environmental and safety legislation given the dangers to the ecosystem and its inhabitants. See Ronald G. Sutherland, "The destruction of old and obsolete chemical weapons: past experience," Karlheinz Lohs & Thomas Stock, *The Challenge of Old Chemical Munitions and Toxic Armament Wastes* (Stockholm International Peace Research Institute: Oxford University Press 1997), 141-145.

53. For example, by the early 1970s the Army had to do something about the M-34 Sarin-filled cluster bombs that were stored at Rocky Mountain Arsenal. By this time, some of the bombs were already 10-20 years old, and their components had deteriorated significantly thereby placing the corrosive nerve agents in a volatile position. Sterling Seagrave notes that the "M-34s stocked at Rocky Mountain Arsenal were said to rattle like a brown bag of empty beer bottles when they were moved or shaken" (Seagrave, 1981: 236).

biodegradation methods, but each alternative was rejected because they all presented a similar problem; the by-products formed during the process would create even more serious disposal problems than the basic material. (Birks, 1991; Office of Chief of Engineers, 1971). Although the original plan for the mustard stored at RMA was to bury it deep in the ocean, the U.S. National Academy of Sciences (NAS) recommended in 1969 that ocean dumping be abandoned in favor of chemical neutralization or incineration (Sutherland, 1997; Office of Chief of Engineers, 1971). Chemical neutralization and incineration of the mustard gas became the preferred disposal methods simply because it was assumed that these methods would create fewer by-product wastes than the other methods. Yet, it was an accepted fact that a significant amount of waste by-product would be generated and there would also be adverse environmental effects, which could not be avoided (Office of Chief of Engineers, 1971).

Project Eagle was the code name for the 'demilitarization' efforts that were undertaken at Rocky Mountain Arsenal between 1972 and 1976 (Sutherland, 1997; Birks, 1991).⁵⁴ Phase I of the project was carried out between 1972 and 1974 and it involved the incineration of 3071 tons of two types of mustard gas (Levinstein or H and Distilled or HD mustard), incineration of the 3407 one-ton containers that stored the mustard gas, and the thermal destruction of 21,000 chemical warfare agent identification sets, or CAIS, which contained 17,055 kg of various chemical warfare agents. (Sutherland, 1997; Office of Chief of Engineers, 1971). This process involved: heating the one-ton

See Sterling Seagrave, *Yellow Rain: A Journey Through the Terror of Chemical Warfare*, (New York: Routledge), 230-240.

54. I provide only the detail of Phase I of Project Eagle. In brief, Phase II of the 'demilitarization' efforts involved both incineration and neutralization of M34 cluster bombs, M139 'Honest John' warheads, M55 rockets containing GB in concrete 'coffins', ton-storage containers, and underground storage tanks. There were 10 million kg of waste salts generated from incineration which were placed into storage drums in a

containers to fluidize the agent and get as much solid residue from the bottom of the ton container into a solution; draining the mustard gas agent from the containers into a holding tank; pumping the mustard solution through a double walled pipe system to the incinerator where it is heated to temperatures between 1400⁰-1600⁰F for 0.3 seconds; and the thermal decontamination of the ton containers at a temperature of 800⁰F for approximately two hours (Sutherland, 1997; Office of Chief of Engineers, 1971).

This process did destroy millions of kilograms of mustard gas stored at RMA, but it also generated the lethal chemicals, sulfur dioxide and hydrogen chloride. These 'objectionable' by-products were passed through a scrubber system containing sodium hydroxide which produced a brine solution consisting of inorganic salts (sodium sulfate, sodium sulfite, and sodium chloride), and ultimately translated into an additional 6.4 million kg of waste (Sutherland, 1997).⁵⁵ The salt waste residues also contained other toxic elements, such as arsenic and lead, and therefore were treated as hazardous waste to be placed in yet another landfill, or perhaps sold to the public through the Defense Disposal Agency (Office of Chief of Engineers, 1971).⁵⁶

landfill, while the liquid waste generated from 'demilitarization' efforts was transferred to a lagoon. See Sutherland, 141-145.

55. The Army refers to these chemicals as 'objectionable' in their analysis of the 'temporary' air pollution that is created from incineration of chemicals in the 'demilitarization' efforts. What is truly objectionable are the problems associated with scrubber systems and their inability to completely prevent the most dangerous toxic emissions into the air. I will reveal some of the problematic aspects of incineration technology in a following section of this chapter. See Office of the Chief of Engineers (Army), Project Eagle Phase I. *The Disposal of Chemical Agent Mustard at Rocky Mountain Arsenal, Denver Colorado*, PB200540F (National Technical Information Service, 1971), 1-15.

56. The Defense Department rids itself of some of the unwanted toxic materials it has produced by including them in a mixed lot of innocuous surplus goods to be auctioned to the public. A Pentagon official confided their unofficial policy: "If you wanted to buy some used typewriters from the Defense Department, we would throw in some used or expired toxic chemical" (Shulman, 1992: 21). Often the toxic materials are dumped wherever possible by the purchaser because their corrosiveness and toxicity are so potent that they frequently lack any civilian application. Critics claim that the Defense Department is fraudulently disposing of toxic waste by selling it to the public in order to avoid the costs associated with proper disposal. The Defense Department has responded by saying that they have learned to take their markings off of all barrels of chemicals they sell to avoid culpability. See Seth Shulman, *The Threat at Home: Confronting the Toxic Legacy of the U.S. Military* (Boston: Beacon Press, 1992), 20-31.

By 1982 there was no military or commercial production occurring at Rocky Mountain Arsenal. In 1987, it was listed on the National Priority List for environmental clean-up that was enacted by U.S. Congress in 1980 known as the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or 'Superfund' (Dycus, 1996; Thomas, 1995; Lanier-Graham, 1993).⁵⁷ Despite noble intentions, CERCLA is complicated, difficult, and costly to implement especially when applied to a federal military facility (Greene, 2002)⁵⁸ One of the main conflicts in the RMA case has been the interpretation of the responsibility and authority of CERCLA versus The Resource Conservation and Recovery Act of 1975 (RCRA) (Greene, 2002; Dycus, 1996).⁵⁹ CERCLA gives the federal government and the Environmental Protection Agency (EPA) authority to control the clean-up of a federal facility, whereas RCRA gives the State authority to enforce environmental compliance with state standards (Dycus, 1996).

The situation at RMA was further complicated when attempting to evaluate financial responsibility for an attempted clean-up because the Army was not the only polluter (U.S. GAO, 2001; Wiley & Rhodes, 1998; U.S. GAO, 1996). Shell has worked very hard to discount their contribution to the toxic nightmare on the grounds of the Arsenal and the leaks to surrounding areas. Some have argued that Shell deliberately

57. This law concerns the clean-up of abandoned waste sites, whether privately or publicly owned. The government attempts to identify the Potentially Responsible Parties (PRPs) who will then be held liable for the costs of remediation. See Stephen Dycus, *National Defense and the Environment* (Hanover: University of New England Press, 1996), 80-95.

58. Greene notes that the number of actors, statutes, perspectives, and issues becomes confused and conflictual when the federal government, under the guise of the Department of Defense (DOD) or the Department of Energy (DOE), assumes the role of the Potentially Responsible Party (PRP). See Greene, 5-10.

59. RCRA provides for the management of solid and hazardous wastes. Its focus is the generation, transportation, treatment, storage, and disposal of hazardous wastes, and requires that the approval of a new permit is dependent upon corrective action from past polluting. See Dycus, 80-84.

delayed the clean-up at the Arsenal through adamant denials of the site's hazardousness and litigation.⁶⁰ The main strategy of Shell and the Army has been the 'global settlement' approach, which means that all issues are negotiated and resolved at once (Maret, 2002). The likelihood of a thorough and detailed analysis of contamination at the Arsenal vanishes with such a strategy, yet this is precisely the goal of a company like Shell which profits from the manufacture and disposal of lethal 'products'. According to Maret consolidating the issues ensured that:

"regulators would be out-staffed and ill-prepared for every discussion because there was too much information to process, and the proper regulators would not be present to address issues raised; contamination that would be major issues at any other Superfund site were downplayed (and overshadowed) at the Arsenal by the most blatantly horrendous sites; and decisions would be forced before adequate information was available (NDMA in the Arsenal groundwater, dioxin in the soils, an incomplete ecological risk assessment, an insufficient characterization of the hex pits, ad nauseam)" (Maret, 2002: 2).

Shell also proposed that the Arsenal become a National Wildlife Refuge (NWR) after the environmental clean-up is completed (EPA-fact, 2002). This suggestion gained full support in 1986 after the appearance of bald eagles, a species designated as endangered and protected under an Act of Congress passed in 1940, in the southwest quadrant of the Arsenal (Wiley & Rhodes, 1998). Yet, activists, like the Sierra Club, suggest that the bald eagles, which are not indigenous to the area, have been baited and encouraged to nest at the Arsenal (Maret, 2002). Shell was campaigning for NWR designation because it introduces yet another regulatory participant and a new layer of rules to complicate the dispute over clean-up (U.S. GAO, 1996). Under federal law, the

60. The history of litigation resulting from Superfund designation, and hence remedial environmental action, at Rocky Mountain Arsenal is extensive and complicated. First, it involved the state suing the Army and Shell to comply with State environmental clean-up laws as defined by Colorado Hazardous Waste Management Act (CHWMA). Second, the Army sued Shell to recover a share of the clean-up costs. Third, Shell sued its insurance companies to gain liability coverage. Finally, the state sued the Army to secure jurisdictional authority for the clean-up at RMA under RCRA. This chapter details only a portion of these events. For more detail on the history of litigation due to RMA see Dycus, 80-95.

U.S. Fish and Wildlife Service (FWS) have jurisdiction to take virtually any action to protect the endangered species (Wiley & Rhodes, 1998). This means that FWS have the authority to prohibit any clean-up proposed or initiated, or they can mandate further remediation. The involvement of FWS at the Arsenal has resulted in further delay because they initiated an investigation to evaluate the eagles' use of the land, and prepared a report detailing the vision of the nature reserve projected to emerge after the clean-up (U.S. GAO, 1996). Perhaps most importantly, wildlife refuge designation reduces clean-up standards from a residential level of remediation to a less stringent level required for wildlife, thereby reducing costs and perceived severity of the magnitude of contamination (Maret, 2002).

Litigation, site assessment, and the refuge designation consumed ten years of resources, while no major decisions were made about clean-up remedies (Maret, 2002).⁶¹ Critics of the refuge proposal note that despite idyllic representations of a former military installation turned wildlife refuge, the clean-up is going to involve the destruction of a significant portion of the habitat. At least three-quarters, and maybe more, of the soil must be tilled due to the magnitude of contamination (Gascayne, 1993). Yet, idyllic representations are the linchpin of this public relations driven proposal. How dangerous could this site really be to us if there are over three hundred species of birds, amphibians, reptiles, and fish inhabit the area? Moreover, how dangerous could this site be to us if the Army will permit tours of these beautiful animals in their 'natural' habitat? Schools and families were targeted to visit RMA for their wildlife viewing pleasure until local

61. GAO reports that the cost of the study phase and assessment at the Arsenal, \$354 million dollars, represents the costliest phase in the history of the Department of Defense clean-up program. See GAO-NSIAD-96-32, *Environmental Clean-up: Progress in Resolving Rocky Mountain Arsenal* (GAO, March 1996), 1-3.

citizen groups succeeded in preventing these toxic tours given that the visitors would inevitably be exposed to volatile and deadly chemicals as the soils are moved in the remediation efforts (Warner, 2002; Horrocks et. al, 2002).⁶²

The Army and Shell have consistently denied and downplayed the enormity of contamination and the inevitable threat posed to the ecosystem and all life forms, despite the EPA's designation of Rocky Mountain Arsenal as one of the nation's most severely contaminated sites (U.S. GAO, 1996). There were at least 750 chemicals produced at the Arsenal during its 'productive' history, and although the volume of hazardous materials remains uncertain, Army estimates in 1984 identified 88 polluted sites consisting of at least 16 million cubic yards of contaminated buildings, equipment, and soil (Greene, 2002; U.S. GAO, 1986). By 1996, the General Accounting Office (GAO), reported that the number of sites had increased to 209, divided into 'on-post' and 'off-post' segments. The groundwater and the soil are contaminated with a toxic brew including: nerve agents, diisopropyl methyl phosphorate (DIMP), dieldrin, aldrin, arsenic, lead, chromium, mercury, and volatile compounds, such as benzene, toluene, and xylene (Yelenick, 2002; U.S. GAO, 1996). The exact volume of hazardous material within these identified sites still remains uncertain.

As I noted in chapter two the Army excels at publishing impressive looking pamphlets to outline their 'successful' clean-up efforts and the Arsenal is a prime example (Shulman, 1992). Despite their claims of 'milestone' achievements, a critical examination of their records reveals many gaps in their notion of 'clean-up' which citizen

62. John Yelenick notes that between 1991 and 1994 200,000 school children visited Rocky Mountain Arsenal under the auspices of a 'natural' wildlife refuge tour. See Yelenick, 12.

groups and activists continue to rail against (RVPRO-milestone, 2002).⁶³ The Army notes that July 1995 marked the completion of two years round the clock incineration of 10.9 million gallons of waste from Basin F. Part I of the remediation effort began in 1988; it entailed the removal of liquids from Basin F to storage tanks and the removal of soil and sludge to a double-lined waste pile (Greene, 2002; U.S. EPA-on-site, 2002; Seigel et al., 1991). A team of workers toiled for nearly two years to complete this preliminary effort. The materials dumped in Basin F were so toxic that the workers had to wear two layers of impermeable suits, breath oxygen from a scuba tank, and after each shift their entire layer of work suits needed to be disposed of in a licensed hazardous waste facility (Shulman, 1992).

These remediation efforts at Basin F caused serious health complications for a low-income neighborhood nearby. In 1988, the movement of liquids and soils from Basin F caused toxic clouds, which were a motley crew of toxic chemicals and lethal pesticides some of which had been banned in the 1970s, to escape, waft away from the Arsenal and sickened area residents for months (Gascayne, 1993). During these ‘clean-up’ operations, low-income mobile-home residents of nearby Irondale began to complain of dizziness, nausea, and vomiting (Siegel et al., 1991). The Army minimized their concerns, and only offered air ‘purifiers’ to those who complained (Seigel et al., 1991). Five years after being exposed to these toxic wafts of clouds, residents were still reeling from the effects. One Irondale resident said: “some days it feels like your eyeballs are

63. For information on the clean-up activities between 1995 and 2001 see RVPRO-milestones, *A Summary of Accomplishments at the Rocky Mountain Arsenal since 1995* (Medical Monitor Advisory Group RVPRO, February 23, 2002, <http://www.pmrma-www.army.mil/htdocs/involvement/milestones.html>), 1-7. Also see EPA, *RMA Site Fact Sheet* (Commerce City Colorado, February 7, 2002, <http://wysiwyg://69/http://www.epa.gov/region08/superfund/sites/rmasitefs.html>), 1-5.

going to pop out of your head ... when the wind is blowing from the Arsenal the air smells like dead blood” (Gascayne, 1993: 41).

Part II of the remediation plan entailed the incineration of organochloric and organophosphoric pesticides and metals by Submerged Quench Incineration (SQI).⁶⁴ SQI is capable of destroying most organics and ammonia, while producing brine (salty water) that contains lower levels of heavy metals (Gascayne, 1993). After two years of non-stop incineration the SQI was decommissioned, dismantled, and sold for parts (U.S. EPA-on-site, 2002). The Army argues that more than 100 SQI incinerators operate worldwide, with more than a dozen operating in the U.S. The EPA claims that the health impact from incineration is negligible; they calculate the risk of cancer to one in a million (Gascayne, 1993). Colorado citizens living near the Arsenal remain skeptical despite all risk calculations and assurances that emissions from such incineration are minute or statistically insignificant.

The Army fails to acknowledge the inadequacies of this technology; although it may destroy most of the nerve agents and chemicals, it generates volumes of potentially more potent toxic waste that requires yet another landfill space, as well as releasing unburned waste byproducts into the atmosphere thereby contributing to another set of pollution problems (Guir, 1997; Sutherland, 1997; Seigel et al., 1991). This type of incineration releases unburned chemical agents, heavy metals, and particles of incomplete combustion into the atmosphere even when the facility is operating at efficiency standards higher than those set by the U.S. Environmental Protection Agency (Silton,

64. SQI is described by the Army as a high-temperature gas flame incineration process that uses water to cool and wash combustion products and gases. The system is composed of an atomizing injection system with an incinerator chamber, a spray dryer, a venturi scrubber for particulate matter control, a packed-tower

1993; Seigel et al., 1991). The particles of incomplete combustion (PICs), such as dioxins furans, metals, ash and particulates, and other organic compounds, that are generated during the incineration process can be just as hazardous as the waste being destroyed (Silton, 1993).

Dioxins and furans include some of the most toxic chemicals studied; they accumulate in living tissue where they have caused immune systems disorders, liver disease, kidney cancer, birth defects, and death (Seigel et al., 1991). The dangerous metals released by incinerators, such as arsenic, cadmium, lead, and mercury, are not destroyed by the process of incineration. Instead, they are simply redistributed between the air emissions and the ash residue produced by the incinerator (Seigel et al., 1991).⁶⁵ A fine particulate ash residue, fly ash or soot, is released by incinerator stacks even though they contain the pollution control equipment, scrubbers. What is worse is that these small air born particles that escape the scrubbers pose the gravest danger to public health since they are capable of entering the deepest and most sensitive part of the lungs (Seigel et al., 1991). Finally, we must consider the appalling reality that almost half of organic compounds released as emissions are not characterized by the EPA; 44 percent, by weight, of the unburned hydrocarbon emissions of a typical incinerator remained uncharacterized (Seigel et al., 1991).

According to the Army, additional environmental 'milestone achievements' were the efforts in 1998 and 1999 to demolish the interior piping, manufacturing equipment,

scrubber for acid neutralization of exhaust gases, and finally a residuals handling facility. See Gascayne, Stephen "Slipcovering a Superfund Site," *Bulletin of Atomic Scientists* 49 (September 1993), 33-42.

65. These heavy metals are toxic at low-levels and can accumulate in living organisms over time. The health effects associated with each metal vary; for example arsenic causes skin cancer, cadmium causes heart disease, kidney failure, and genetic damage; while lead and mercury damage the nervous system. See Lenny Seigel, Gary Cohen & Ben Goldman, *The U.S. Military's Toxic Legacy: America's Worst Environmental Enemy* (National Toxic Campaign Fund Boston: MA, 1991), 41-42.

and buildings at the South Plants. The Army boasts that during the remediation over 1400 tons of steel was removed from the site and recycled. According to the Army, as of 2000, the demolition at South Plants was 98 percent completed (RVPRO-milestone, 2002). Yet, 'completion of clean-up' is a very misleading assertion since the chemical sewers, contaminated soils, and underground infrastructure will not be excavated, but instead 'capped' in place with concrete (Maret, 2002). The Army has created such a disastrous mess at the Arsenal and the only thing we can determine with certainty about the situation is that there is no sure method of eliminating all of the toxic wastes, by-products, liquids, sludge, equipment, structures, etc. The Army asserts with confidence that 'capping' the incredibly lethal waste is 'safe', but are remiss about previously 'capped' landfill waste migrating underground to other regions where it has surfaced in soils and water systems.

Basin A recounts a similar story of Army remediation efforts. Basin A, which used to be an unlined waste pond for toxic chemical burial, has not been excavated, but instead resurrected as a dump site. The Army is extremely proud of themselves as they describe Basin A consolidation and construction that was completed in 1999; more than 200 truck loads of 'low-level' contaminated waste are trucked to Basin A each week (RVPRO-milestone, 2002). Soil and debris from the munitions testing and burial trenches area at RMA were some of not so 'low-level' waste transferred to Basin A between 2000 and 2001. The plan to merely 'cap' the lethal waste filled site once it has reached its maximum holding capacity has outraged the people who live near the Arsenal (Maret, 2002; Warner, 2002). 'Capping' the waste provides only a linguistic illusion that somehow the lethal wastes will not migrate away from the 'state-of-the-art' technology

that contains them. Yet, 'state-of-the-art' technology has failed miserably in the past, leaving the ecosystem and its inhabitants vulnerable to the poisonous waste that perhaps no technology is ever capable of eliminating.

There is fierce debate and disagreement over the threats posed by various chemicals and combinations of chemicals (Lawson, 1993). Moreover there are serious limitations in our current knowledge about the effects on the ecosystem and all inhabitants surrounding militarized areas like Rocky Mountain Arsenal (Lohs & Stock, 1997). Lack of concrete scientific information, differential impacts within the ecosystem, and the inability to dissect all contributing factors to health and environmental problems provide a rich setting for dispute. Nonetheless, there have been occurrences at RMA that cannot be ignored and are difficult to dispute. At least 2000 ducks and other waterfowl were killed annually as a direct result of landing on the Arsenal's sewage reservoirs (Birks, 1991). Doves, sparrows, robins, and starlings have been found in convulsions or already deceased throughout the installation (Maret, 2002). Rabbits and badgers have also experienced violent convulsions after which time death follows (Horrocks et al, 2002). Autopsy reports revealed that many of the birds died of emaciation, which is a common occurrence in cancer, and a possible effect of endocrine disruption due to chemicals such as dieldrin and dioxin (Maret, 2002). The birds, badgers, and rabbits all had high concentrations of organochloride pesticides in their brain tissue, and dieldrin poisoning in their body fat (Horrocks et al, 2002). There have also been documented health problems, such as testicular atrophy and antler velvet problems, in deer (Horrocks et al, 2002; Maret, 2002). Finally, earthworms have tested positive for arsenic and dieldrin, even in areas that are supposedly relatively 'clean' (Horrocks et al, 2002).

According to the Army and the Agency for Toxic Substances and Disease Registry (ATSDR) there are no negative human health implications due to the motley brew of toxic contamination at Rocky Mountain Arsenal.⁶⁶ Yet, the preliminary study offered by ATSDR of RMA does not actually study the health in the community; instead it merely summarizes existing literature (ATSDR, 1996). This so-called watch-dog agency may be reluctant to conduct health studies at communities around the Arsenal since their results could provide residents with information to strengthen lawsuits against the government (Seigel et al., 1991). Since there is a lack of independent research on health effects at Department of Defense (DOD) facilities, it is easy for the Army to maintain that there are no negative health effects due to their activities at the Arsenal.

This situation is further aggravated by the reality that a comprehensive assessment of health effects from military pollution is difficult to obtain due to a lack of information about the number and type of toxic substances used by the DOD (Kimball et al., 1993). Although Dr. John McLachlan of Tulane University produced new data that suggests that pesticides like dieldrin, chlordane or toxaphene are weakly estrogenic on their own, but are up to 500 or 1000 times more potent in combination (Arnold et al., 1996). The implications of this finding for the region surrounding the Arsenal are profound, if not debilitating, when attempting to evaluate the combined effects of the 750 different chemicals produced, dumped, and now polluting the air, water, and soil. The Army acknowledges some risk associated with their 'peace-time' activities, but maintains that they are minimal and necessary to 'protect' American citizens from external 'threats'. I have presented the situation at Rocky Mountain Arsenal to invert this claim; the risks

66. The Agency for Toxic Substances and Disease Registry is the 'watchdog' agency that was created to perform health assessments at all of the National Priority List sites. See Seigel et al., 13-14.

associated with 'peace-time' activities, like those at Rocky Mountain Arsenal, are the main threat to human and ecological security.

Rocky Mountain Arsenal exemplifies the riddle of contradictions that one must wade through in order to assess 'peace-fare' missions. Evidence of toxic contamination literally surfaced in water systems and agricultural soil only a few years after production commenced at Rocky Mountain Arsenal, despite the Army's claims that none of the lethal chemicals, pesticides, fuels, and other military and industrial contaminants produced were migrating away from the site. The Army was unable to sustain this denial and shifted their argumentation to the legal levels of permissibility for these contaminants and a denial of any negative ecological or human consequences. The Army claims that the chemical agents, among other pollutants produced at the Arsenal, chemicals that were specifically designed for their potent killing capacity, are not harmful as they seep into our soils and water systems. In addition, despite Army claims of 'safe' levels of contaminants, the site has been deemed the most toxic square mile on earth and in need of substantial environmental restoration.

The situation is further complicated as the Army exploits the absence of all sorts of information. Although more accurate records were kept of production and disposal of various chemical contaminants beginning in the 1970s, the decades prior to this have an appalling absence of precise production and disposal records. The level of contaminants have consistently been underestimated as a result of absent records and the classification of other records. In addition, the lack of definitive scientific knowledge and independent study of the synergistic effects of chemical combinations makes the Army's position that

the chemical combinations of the 750 varieties they have produced are not harmful a difficult one to refute.

The age of deterrence has justified the build-up of an infinite arsenal of weapons to achieve 'peace'. I suggest that the infinite production of lethal chemicals and their accompanying toxic by-products, as well as their eventual necessary disposal has shifted the 'enemy target' to include domestic territory. In their efforts to deter their 'enemies' and 'protect' U.S. citizens the U.S. Army has waged war against its own people and land, since preventing 'war' entails its infinite preparation, which means environmental ruin and significant health complications. The lethality of contamination lingers from a war-readiness posture with no real solution for restoration. The best they can offer for some areas on the site is 'sacrifice'; fence it off and prohibit its use due to the levels of contamination, and yet the Army still claims that there is no threat to the people and their systems of life support. Yet, these 'sacrifice zones' are the most obvious causalities from the Wars of Deterrence that cannot be forgotten for generations as the contamination linger and continues its attack.

Chapter 4: A Reflection upon Contemporary War

“Sooner or later, if civilization is to survive ... war must go” (General Douglas McArthur in testimony to the U.S. Congress, 1951 in McMurtry, 1989: 3).

This final chapter is a reflection on some of the factors that have influenced the developments of military ‘peace-fare’, which I am suggesting is a distinct aspect of contemporary war. In the previous three chapters I interrogated military logic of an infinite pursuit of war-readiness by presenting the horrific wreckage ‘peace-fare’ missions leave behind. Here my concern lies with a broader analysis of some of the key historical and institutional factors which have contributed to a lack of clear demarcation between war and peace or military and civil life. There are varying approaches to analyzing the nature of wars and there is debate regarding the changed nature of wars, as well as the factors impacting these changes. Nonetheless, there is some agreement that we are currently experiencing an intensification of death and destruction from earlier periods and that the pursuit of ‘peace’ may be as lethal as the eruption of war (Gray, 1997; Cuomo, 1996; Schott, 1996; Virilio, 1983:1997). Two factors influencing this intensification are related to technological developments that have improved killing efficiency as well as forces of bureaucratization which enabled military-political-economic linkages to a degree unprecedented in history. We are currently experiencing a new ‘war consciousness’ which cannot be conceptualized as an event with a distinct beginning or end (Cuomo, 1996). Instead, it should be conceptualized as the evolution toward the militarization of all aspects of life.

Spatial metaphors which bind war as an isolated and sporadic sphere of military activity separate from times of ‘peace’ are thoroughly inadequate to conceptualize contemporary warfare and ‘peace-fare’. Instead of focusing on an event-based

conception of war it seems more useful to focus on militarization and its seepages into and usurpations of what was once identified as civil life. Militarism has been defined as “primary reliance on coercive means, particularly violence or the threat of violence, to deal with social problems” (Pilisuk & Hayden, 1972). It has also been defined as the “organization of the civilian sector after the model of the military establishment” (Powell, 1970: 14). I am asserting that militarism has become a foundational trope in our current social and political imagination (Cuomo, 1996).

The infinite pursuit of destructive powers to harness violent energy and prepare for a war that most agree should never be fought, marks an important and distinctive point in a long history of empire building based on domination and conquest. Post WWII and the emergence of the Cold War inaugurated a war strategy based on mutual deterrence through the infinite preparation of annihilation warfare. This infinite war-readiness, along with an ideological construction of the ‘enemy’, has been referred to as ‘peace-fare’. In the previous chapters I attempted to demonstrate that ‘peace-fare’ entails an assault to such an extent that it cannot be clearly demarcated from warfare. ‘Peace-fare’ has also obliterated the signification of ‘external’ or ‘foreign’ threats because ‘peace-fare’ targets all life regardless of national or conceived spatial boundaries. The United States’ ‘national security state’ has institutionalized the use of military spending to stimulate the economy, and in the process has required a high level of mobilization of the nation’s natural, scientific and technological resources. The diversion of a significant proportion of societal resources to sustain the war-machine has not only promoted societal non-development, but now threatens planetary annihilation.

Along with the emergence of a 'national security state' we have witnessed unprecedented technological mastery of destructive warfare in the last five decades. Militarism has infused scientific and technological development with a violent determinacy. Our technological capacity has reached absolute destruction, or in other words, together with our 'enemies', we face mutual annihilation. The collapse of the Soviet Union and the end of the Cold War has not resulted in a collapse in militarized national security exploits. We continue to experience the unrelenting assault of 'peace-fare' missions and the lethality of its lingering effects, while a state of permanent war-readiness continues to be justified according to military-defined principles of 'national security'. Yet, my analysis in the previous three chapters exemplifies that the last five decades of 'peace-fare' pose the greatest threat to human and ecological security. How can we maintain the logic of militarized 'national security' when it is attained at the expense of human and ecological security? Perhaps more importantly, how can we change militarized 'national security' which is premised on the sacrifice of its people, resources, and ecosystem?

Although post WWII stands as an important marker, it does not stand apart from earlier developments in warfare. Therefore, I will briefly outline two interrelated pre-WWII developments which have influenced contemporary war. These developments were the militaristic drive for natural resource acquisition and the emergence of 'peace-time logistics'. The military is recognized for its historical role in securing access to natural resources for the nation state (Finger, 1991; Westing, 1988, Virilio, 1983;1997). Arthur Westing asserts that "the rise of the State might not have occurred without a combination of natural resources limitations and the acceptance of war as an appropriate

means for achieving societal aims” (Westing, 1988: 4). Paul Virilio suggests that when the state was constituted, “it developed war as an organization, as territorial economy, as an economy of capitalization, of technology” (Virilio, 1983; 1997: 11). Securing access to resources for nation-state formation through war-making has evolved to include not only the ability for domination during war, but also the readiness for domination even when war is not declared. The development of ‘logistics’ enabled a nation’s resources to be funneled to the war-machine at all times and in the process has contributed to the lack of clear demarcation between war and peace and military and civil.

Although the military ‘peace-time logistic’ drive was of European origin dating from the eighteenth century, it became institutionalized in American armories and arsenals (De Landa, 1991). ‘Logistics’ can be described as “the art of military procurement and supply through the assembly of war and the resources of the planet that make it possible” (De Landa, 1991: 23). Standardization of manufacturing processes and rationalization of labour were critical to logistical needs of weapons repair, procurement, and supply. The impetus to wrest control of people’s sensual and direct relationship to matter, which artisans had when they produced objects by hand, and mechanize production fulfilled a critical military need (De Landa, 1991). Uniformity and the interchangeability of firearm components solved the military requirement for spare parts and their circulation whether in times of war or peace. Yet, logistic rationality extended beyond the mechanization of production; a militaristic command and control management structure to procure and discipline skilled labour was also imposed. The engineering of materials would not suffice in the effort to wrest control of the production process from the artisan. It was determined that the human body and mind should both

be engineered to insure compliance with a militaristic command imperative (De Landa, 1991). Mechanized production and command management enabled continual orchestrating and monitoring, which was at the expense and degradation of the reservoir of human skills.⁶⁷

Currently, the logistics of war have nearly consumed all strategy of war; a paramount aspect of 'national security' is 'peace-time' military procurement to deter 'foreign threats'. Standardization and uniformity for mass production, as well as command and control management principles have imposed militarism in civilian life to an unprecedented degree. The logistics of 'peace-time' war preparations have been relentless since the end of WWII, and yet to call war 'pure', as Virilio does, cannot capture the lethality of the toxic ruptures and leakages associated with constant war preparations. The paradox inherent in 'peace-fare' is that it entails its own monumental war-like assault, and is arguably worse than war since there is no plan to halt it. As I highlighted in the previous three chapters, five decades of military 'peace-fare' have demonstrated that it not only commands important social resources, but simultaneously generates mountains of lethal contaminants that inevitably contaminate our water sources and agricultural soils as well as pollute our atmosphere. Civilians and the environment have been involuntarily enlisted in wars for thousands of years, yet post WWII

67. The militaristic-driven disciplining effect of labor management principles, like Taylorism and scientific management, as well as the goal of extracting human skills from people's bodies and transferring them to machines were both initiated with the advent of mass production. These goals continue presently in the pursuit of Artificial Intelligence, or capturing human expertise in computer 'knowledge banks', for the military end of potentially having a battlefield without human soldiers. The military's pursuit of uniformity, discipline, and control are important elements influencing the evolution of blurred boundaries between military and civil. For more information about the rise of scientific management principles and its links to militarism see Manuel De Landa, *War in the Age of Intelligent Machines* (New York: Zone Books, 1991), 31-40.

technological mastery of destructive forces and the centralization of armed forces have infected all aspects of society with infinite militarization.

The U.S.'s strategic posture during and after WWII shifted from 'defense', or preventing foreign powers from conquering the U.S., to 'national security' which entailed the protection of domestic economic, political, and military interests throughout the world (Hooks, 1992). A permanent war economy supported by actors within a military-industrial complex promoted the 'national security state'. A permanent war economy thrives on government intervention to stimulate the economy through military investment (Bischak, 1993; Melman, 1992). The permanent mobilization of military forces became the means to stimulate key sectors in the U.S. economy. Military and corporate officials promoting a military-driven system of national accounting established the belief that economic problems, like unemployment, underutilization of capital, and lack of economic growth, could be remedied through military spending (Waring, 1999; Waring, 1988; Caldicott, 1984). A structural connection between the privately incorporated economy and military ascendancy has been established as the Department of Defense runs the largest centrally planned economy in the world (Waring, 1999; Melman, 1974; Mills, 1958). Militarism as economic policy and political strategy is a foundational element in the self-fulfilling, infinite pursuit of the preparation for domination in war.

The origins of the military-industrial complex are often traced to the end of WWII although most of its salient features (for example, military domination of the federal budget, armed adventures and interventions abroad, and political influence of prominent military officers) date from the origins of nationhood (Lens, 1970). The 'national security state' is premised on a concentration and centralization of power for war-making

and war preparation institutions in the U.S. government, economy, and society (Bischak, 1993). In 1944 Charles E. Wilson of General Electric proposed that “every large company choose a liaison man with the armed forces ... because military preparedness must be once and for all, a continuing program and not the creature of an emergency” (Lens, 1970: 18). The concentration and institutionalization of military goals presents one of the formidable obstacles to convert a permanent warfare state to one that would promote *real* security for people and their environment.

As I have noted the military-industrial complex emerged as a post WWII concept of ‘national security’. The ‘national security state’ secured its support and legitimation by providing critical sectors of U.S. society an economic stake in ‘national security’ policy, and by gathering together social interests into political and legal consultative structures which would advance militaristic policy (Bischak, 1993). Although the rhetoric fed to the public regarding the goals of ‘national security’ has been the preservation or achievement of ‘peace’, in reality the goals have been imperialistic pursuits and a permanent warfare domestic economy to sustain them.⁶⁸ The belief in the nation’s salvation from an external ‘threat’ conceals these goals, promotes the secrecy requirements of a ‘national security state’, and sustains the authority of vested interests. Those with vested interests in a ‘national security state’ encompass decision-makers,

68. The focus of this thesis is not on the imperialistic history or goals of the United States. In brief, the goal of capitalist imperialism after WWII has entailed the expansion of U.S. business interests sustained by military domination throughout the world. More specifically capitalist imperialism is aimed at opening up markets for the export of surplus consumer goods and also to use the colonial country as a producer of raw materials, which the industrial nation requires for manufacturing. The military-industrial complex promoted two techniques to achieve these goals: first, a system of aid and loans aimed at stabilizing the economies of their allies and keeping them ‘in sync’ with ‘American way’; and second, a system of military alliances, military training, and support as well as the use of paramilitary and trade associations to assure that the governments which accept American capitalism remain in power. See Sidney Lens, *The Military-Industrial Complex* (Philadelphia, Pennsylvania: Pilgrim Press, 1970), 15-32. Also see Noam

including foreign owners and officials who, together, by occupancy of senior state office, ownership of private capital or ascendant party, direct society's use of the major means of destructive production, and who also individually secure profit and power to command by military enforcement (McMurtry, 1989).

The vested interests include extravagant profits from securing international arms trade, and the expropriation of foreign land, markets, and resources (Isla, 1997; McMurtry, 1989; Lens, 1970). Although it is evident that high ranking political, corporate, and military officials promote their self-interests through militaristic pursuits, they do not constitute a monolithic or static group. Their actions are not necessarily pre-determined despite their strong alliance in support of domination and profiteering from death and destruction. As much as those with vested interests in military prowess collude to promote and sustain their power and profit interests they must also compete among themselves for access to strategic and limited resources. Power is not omnipotent; instead power is diffuse in a hierarchy of relations. Although, an analysis of the history of war-making reveals one consistent principle: decision-makers in society have secured their interests through protection by armed forces.

The military-industrial complex can be defined as "an interlocking set of interests among military-serving businesses, the Pentagon, and Congress, which together have perpetuated military spending to the mutual benefit of each participant" (Bischak, 1993: 145). Pentagon officials, corporate contractors, and politicians, often referred to as the 'Iron Triangle', all cooperate to promote an industry of death and destruction (Bischak, 1993; Caldicott, 1984). Yet, the military-industrial complex creates pockets of support in

scores of milieus outside the most apparent and direct contributors. This support comes from think-tanks (for example, RAND Corporation), educational organizations (for example, the Center for Strategic Studies), trade associations, labour unions (the American Federation of Labor), academia, veterans organizations, media, and the right-wing factions of the church (Leslie, 1993; Melman, 1974).⁶⁹ It holds these forces together with mountains of money, promotions for the officer caste, as well as an appeal to patriotism and 'nation-state security' (Lens, 1970).

The individuals who guide and influence the war-making goals of the military-industrial complex are a close-knit group that shuttle back and forth from one milieu to another (Melman, 1974). It is common for former military personnel to enter Congress or corporate positions while industrial, legal, and academic figures shift from private industry or the university to key posts at the Pentagon (Bischak, 1993; Lens, 1970). In addition, there has been remarkable stability and continuity in the military procurement industry (Dumas, 1991). The continuity has been most striking among the science-based firms (aerospace, defense electronics, and transportation industries) with only twenty-five corporations monopolizing military contracts over nearly four decades (Bischak, 1993).

The associated political and economic cohesiveness among business interests, along with rapacious desire for profits, has certainly advanced government military spending priorities. The military-industrial complex has promoted the progression of

69. There has been extensive research and writing about the influence of these various groups in sustaining and promoting the national security state. The importance of mobilizing resources and support from influential sectors in the economy including labour unions, the university, and scientific research and development are well documented. The scope of my analysis of the military-industrial complex is limited to merely pointing to areas co-opted by militarism. For more information see: Stuart Leslie, *The Cold War and American Science: The Military-Industrial-Academic Complex at MIT and Stanford* (New York: Columbia University Press, 1993), 1-13. Also see Gregory Bischak, "The Obstacles to Real Security: Military Corporatism and the Cold War State," Kevin J. Cassidy and Gregory A. Bischak, *Real Security:*

war-making institutions to the world's largest and most lucrative industry. The U.S. military is a major multinational corporation with assets equal to half of all the U.S. manufacturing corporations combined (Thomas, 1995). Approximately 40 percent of industrial plants and equipment are devoted to military manufacturing and about 30 percent of all U.S. industry output was purchased by the Pentagon in 1989 (Thomas, 1995). The corruption of institutionalized profiteering from mass violence and environmental ruin presents a formidable obstacle to challenge the present militaristic system, which I have asserted in the three previous chapters presently threatens the continuation of life on this planet.

The destiny of the military-industrial complex depends on how effectively it mobilizes public acceptance for its aims, as well as fashions a national spirit of discipline and conformity similar to what governments impose in times of war (Lens, 1970). This military machine not only procures and destroys precious societal resources and generates mountains of lethal waste, but it also demands discipline, obedience, conformity, and subordination to it from all facets of national life.⁷⁰ 'Peace-time' preparation for war has meant that more and more layers of civilian life have become integral to the operation of the military machine (Lens, 1970). The threat of an external

Converting the Defense Economy and Building Peace (Albany, New York: State University of New York Press 1993), 133-164.

70. The roots of civilian discipline and conformity can be traced to the drive for mass production and uniformity during the industrial revolution as I have alluded to in the previous section outlining the development of 'peace-time logistics'. There are a multitude of other more recent factors influencing discipline, conformity, and acquiescence toward the militarization of society including: the manipulation of public opinion, lack of democratic input, and centralization or bureaucratization of power. These and other unmentioned influences are beyond the scope of my analysis here. See David Noble, "Command Performance: A Perspective on the Social and Economic Consequences of Military Enterprise," Merritt Roe Smith, *Military Enterprise and Technological Change: Perspectives on the American Experience* (Cambridge, MA 1985), 329-346.

‘enemy’ has been invoked to justify the escalation of militarization, and this ‘enemy’ is also indispensable to the perpetuation of infinite militarization.

The military-industrial complex must be recognized as a great enemy to social change toward peace, equality and justice. My previous analysis in chapters one, two and three has demonstrated that its existence does not assure our defense; instead it is one of the greatest threats to our survival (Lens, 1970). The foundations of the ‘national security state’ must be re-considered. The horrific aftermath from ‘peace-fare’ missions in the Marshall Islands exemplifies that preparing for domination in war threatens planetary security. While the ecological nightmare at Rocky Mountain Arsenal illustrates that a military state opposes most forcefully its own people and domestic territory in the relentless pursuit of war preparedness. Whether ‘peace-fare’ occurs on domestic or foreign territory, I believe my cases examples have illustrated that the ‘external enemy’ has become less of a threat than the internal enemy. Moreover, we should contemplate carefully Virilio’s suggestion that our own scientific might, technological development, and military-industrial economics could promote the end of our own society (Virilio, 1983: 1997).

As I have attempted to demonstrate the total involvement of the economy in war means that there is no longer a clear demarcation between civil and military; war begins in ‘peace’ and the targets are civilians and the environment (De Landa, 1991; Virilio, 1983;1997). It can be asserted that total peace by deterrence, an ideological tenet of the ‘national security state’, is simply, total war pursued by other means (Virilio, 1983;1997). Far from assuring peace, militarism develops the momentum for war. Deterrence promotes the upsurge of acts of war that are not declared as war. A strategy of deterrence

also means that military institutions are fighting less against one another, and instead wage monumental battles against the ecosystem and the life that depends upon it (Virilio, 1978). I suggested in chapter two that the Marshallese were subjected to acts of undeclared war as the U.S. detonated hundreds of nuclear weapons in close proximity to populated islands and yet maintained a posture of 'peace'.

War can no longer be conceptualized simply as eruptions of conflict, but also as an everyday drain on what was once identifiably civilian life and the ecosystem. The zero growth of civilian society goes hand in hand with the absolute growth of a military state (Virilio, 1983: 1997). A warfare state, like the United States, not only pauperizes its society, but also wages a lethal and unrelenting assault against it. My analysis in chapter three reveals that residents surrounding Rocky Mountain Arsenal have been making these claims for decades as they struggle against military toxics leaking and migrating throughout their soil, water systems, and air. The history of conquest based on war-making, violence and domination has evolved from pursuing the annihilation of the 'other' to pursuing the annihilation of all planetary existence. The paradox inherent in 'national security' pursuits, or promoting 'peace' by deterring one's 'enemy' with infinite readiness for mutual annihilation, is the inversion of 'national security' to not only national, but planetary insecurity.

War is scientific and technological preparation; an infinite preparation that will eventually exhaust and eliminate society and perhaps all planetary life despite claims to preserve and protect. The apocalypse lies in the foundations of our development; the development of warfare precludes the development of human and social dimensions of society (Virilio, 1983: 1997). Michael Renner provides us with an important warning:

“environmental degradation may imperil a nation’s most fundamental aspects of security by eroding the natural support systems on which all human activity depends” (Finger, 1991: 223). Consider that the research and development (R&D) sections of the Department of Defense and its allied agencies command between 70 and 75 percent of the Federal government’s total R&D budget (Renner, 1993; Melman, 1991). It can be asserted that the military-industrial complex has held scientific and technological development hostage to a violent determination. We can only ponder with optimistic speculation what the bounds of non-militaristic technological and scientific development would be. In addition, as militaristic growth has become synonymous with economic well-being, the costs associated with this form of ‘development’ have been externalized, or borne by the most vulnerable citizens and the ecosystem.

Seymour Melman identifies four costs incurred by society due to the fact that war-making institutions have been wielding the largest finance capital fund in the American economy (Melman, 1992; Melman, 1991). The first cost to society is the “money-measured direct resources allocated to the military function” (Melman, 1991: 228). The disturbing result is that “seven out of every ten dollars urgently required for environmental and social redress is devoted to military research and development” (Thomas, 1995: 8). The second cost is measured by the civilian use-value from goods and services produced that is forgone because resources are dedicated to military products which will never enter civilian markets (Melman, 1991).⁷¹ A third cost is

71. Supporters of a permanent war economy have argued that military research and development produces useful spin-off products for civilian markets. During the 1950s and 1960s it was easier to advance this position as the economy thrived in the United States. Beginning in the 1970s it was becoming apparent that military spending depletes the economy. Since the mid to late 1970s the real income (purchasing power) and therefore standard of living for U.S. citizens has been declining. An explosion of national debt as well as an expanding international trade deficit are further indicators of an economy with fundamental weaknesses. National debt points to the excessive economic costs associated with warfare and

related to lost productivity of capital. When capital resources are used for new civilian production there is usually improvement in the design of the means of production, or what economists refer to as the marginal productivity of capital. Yet, when capital resources are used for military purposes which cannot be applied to further productive capabilities the incremental productivity of capital is lost forever (Melman, 1992). The final cost to society is cost-maximization which, unlike civilian industrial production, is a central characteristic of military-industrial economics. An increase in costs, therefore maximizing government subsidy, means an increase in price and profit (Melman, 1991; Melman, 1974). It can be asserted that the permanent war economy functions like a parasite as it weakens the larger host that feeds it and depletes civilian development.

Melman highlights important cost considerations of militaristic capitalist economic 'development', yet there are additional negative externalized costs that are either not counted, or instead counted as 'growth', in capitalist systems of accounting driven by military 'development'. Death and destruction account for positive economic growth and well-being in our current systems of economic accounting, while the costs associated with destructive production are disproportionately borne by certain communities (Waring, 1999; Bullard, 1998; Waring 1988). In addition, political stability is premised upon either not thinking about the potential risks or threats associated with nuclear, chemical, and biological destruction or making incalculable risks somehow calculable (Beck, 1995; Ewald, 1993).

'peace-fare' development. America's trade deficit highlights their declining international competitive position for efficiency and quality in production given their prioritization to military technology. For more detail see Lloyd J. Dumas, "The Economic Cost of Ineffective Weapons," Anne E. Ehrlich & John W. Birks, *Hidden Dangers: Environmental Consequences of Preparing for War* (San Francisco: Sierra Club Books 1990), 210-226.

In the U.S. economic system, the production and consumption of destructive warfare accounts for positive economic activity, which is measured as an increase in the nation's gross domestic product (GDP). Since death and destruction from military activities register as a positive economic value in our system of economic accounting, the logic follows that the well-being of people improves as GDP increases. Although, this logic is impossible to sustain once we examine the invisible and externalized costs associated with military 'peace-fare'. As military officials promote the acceptability of turning certain communities into human and ecological 'sacrifice zones', they diminish and trivialize the reality of 'sacrifice' for not only current generations, but also future generations (Bullard, 1998).

Runit Island, indigenous land I made reference to in chapter two, is one area in the world that has been 'sacrificed' for a minimum of 250,000 years due to U.S. military 'peace-time' nuclear detonations at Bikini Atoll. Despite U.S. military assurances to the contrary, the effects of this 'sacrifice' and the future risks associated with nuclear contamination are incalculable. This is because nuclear contamination not only affects life itself but also its reproduction, while at the same time the ecological damage is irreparable for hundreds of thousands of years (Ewald, 1993). It is ludicrous that the U.S. military absolves itself of such decimation by merely suggesting the 'sacrifice zone' remain uninhabited for 250,000 years. Perhaps the U.S. military should be prohibited from developing, producing, or testing any of destructive technological weaponry that produce such 'sacrifice zones' for the next 250,000 years.

It is important to acknowledge that not everyone shares the burden of military toxics and proximity to military 'sacrifice zones' equally. Economically and politically

disempowered people, most likely people of colour or indigenous people, bear a disproportionate burden of military toxic exposure, and have the least ability to obtain protection (MTP & Environmental Health Coalition, 2001; Bullard, 1998; Marshall, 1996). It is not simply an unfortunate coincidence that communities of color in urban ghettos, in rural 'poverty pockets', or on economically impoverished Native-American reservations face some of the worst environmental devastation in the nation (Bullard, 1998). Environmental racism plagues military policy and decision-making regarding military 'peace-fare' activities and has even been recognized by the Environmental Protection Agency, the General Accounting Office, and in an Executive Order under former President Bill Clinton as a national priority (Marshall, 1996).⁷² Yet, official recognition of the racism which is endemic to the production and disposal of lethal military contaminants does not automatically ensure justice for these communities.⁷³ Instead, military 'peace-fare' continues to be prioritized and justified despite the 'sacrifice' of productive land, water, air and human, animal, and plant life which are all required for its sustenance.

The first three chapters provide concrete examples of Ulrich Beck's assertion that nuclear, chemical, biological and other industrial mega-hazards have abolished our ability to calculate the risks associated with these developments (Beck, 1995). First, damage can no longer be limited; it is global and in some cases irreparable. Second, pre-cautionary

72. President Clinton's Executive Order 12898 in 1994 was as follows: "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental consequences of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and its possessions ..." (Marshall, 1996: 1). See Suzanne Marshall, *Chemical Weapons Disposal and Environmental Justice* (Berea, KY: Kentucky Environmental Foundation, 1996), 1-5.

73. For more information about 'environmental justice' and indigenous peoples see Ward Churchill, *Struggle for the land: indigenous resistance to genocide, ecocide, and expropriation in contemporary North America* (Monroe, ME: Common Courage Press, 1993).

after-care is not possible for some of the environmental ruin we currently face. Finally, the destructiveness of our development loses its delimitations in time and space, and therefore its meaning. The ecological crisis induced through the infinite pursuit of military prowess has produced ecological devastation with a clear beginning but no end (Beck, 1995).

The environmental wreckage from U.S. 'peace-fare' missions in the Marshall Islands and at Rocky Mountain Arsenal exemplifies the notion that we have suspended risk logic in the pursuit of death and destruction. These areas, and at least tens of thousands of other sites inflicted by ecological devastation from military missions, can be aptly described as: "an open-ended festival of creeping, galloping, and overlapping waves of destruction" (Beck, 1995: 23). The 'sacrifice' of our ecosystem and its life is never-ending in the pursuit of 'peace-fare', and the real risk lies in the threat of potentially sacrificing all planetary existence for a return of military prowess.

War and peace both should be understood as manifestations of the omnipresence of militarism which is "a product and tool of multiple oppressive, corporate, and technocratic states" (Cuomo, 1996: 31). Neglecting the omnipresence of militarism permits a false notion that the absence of declared war entails peace (Cuomo, 1996). War and peace are both embedded in the constant militarization of political, economic, and social life. This militarization entails state-sponsored violence, which is sometimes invisible and yet persistently a bold agent of racism, nationalism, and corporate interests. Conflict and war persist as declared events, but this should not obscure the ways in which "military violence pervades most societies in increasingly technologically sophisticated ways and the significance of military institutions and everyday practices in shaping

reality” (Cuomo, 1996: 32). War is distinct from earlier periods and forms in its relentless preparation. The consequences of infinite readiness for domination in war, which theoretically will deter a foreign ‘enemy’, entail a never-ending war-like assault against the ecosystem and its life. Moreover, the lack of attention dedicated to environmental wreckage from military ‘peace-time’ missions reinforces the inaccurate notion that war is distinct from militarized ‘peace’.

C Wright Mills noted early in the Cold War that the ethos of war is now all-pervasive; all social and personal life is being organized according to its terms (Mills, 1958). Mills asserted that war “dominates the curious spiritual life of the peoples of Christendom. It shapes their scientific endeavors, limits their intellectual effort, swells their national budgets and has replaced what was once called diplomacy” (Mills, 1958: 9-10). The first three chapters were an attempt to demonstrate that strategic targets have become obsolete and local and global ecosystems are now the targets (Virilio, 1983: 1997; Mills, 1958). I assert that the ‘national security state’ and ‘peace-fare’ have promoted a lack of distinction between attack and defense because the only defense is a preparation for the most lethal attack. It is apparent that a defensive military posture slips into offense instantaneously as the technological mastery of destructive forces does not delineate between peaceful and non-peaceful applications. Any distinction between military and civilian is also obsolete; world populations have become bemused combatants (Mills, 1958). The terror of the military class ensures that the militarized aspects of our civilian identities proceed unrecognized (Virilio, 1983: 1997). War can no longer be considered a continuation of politics by other means, as suggested by Carl Von Clausewitz, because there are no political aims which can be achieved by the annihilation

of all life. Military peril has been induced to achieve 'peace', yet 'peace' terrorizes us with the threat of planetary annihilation and assaults with the veracity of a war.

If humanity has a species-distinctive predilection toward rationalizing war, then the primary enemy needs to be identified as the military system itself which promotes infinite violence to resolve conflict. The first three chapters provided specific examples of 'peace-fare' and its lethal implications and through each I have attempted to reveal the paramount contradiction in military logic of 'security' through the pursuit of destructive forces. The intense resource depletion and mountains of deadly substances evident from 'peace-fare' missions reveals that the U.S. military program increasingly endangers the security not only of own its citizens, but populations worldwide. Nuclear testing in the Marshall Islands and chemical weapons production near Denver, Colorado illustrate that 'peace-fare' poses the systemic violence and threat to civilization and peace that it purports to defend against. The contradiction lies in the reality that militarization produces and propagates an organized attack against civilian peace and security, and the real threat lies in its infinite pursuit. The enemy which threatens us most directly resides within our own borders and therefore notions of enemy must be widened to conceive of the militarist patterns that shape our political, economic, and social life. The question of increasing importance seems to be how we can counter the institutionalized militaristic patterns of development and re-establish our political, economic, and social life in absolute opposition to infinite militarization.

Conclusion

My analysis of U.S. military 'peace-time' missions to maintain an infinite readiness for domination in war is motivated by an urgent sense that we need to find ways to oppose the destructiveness associated with 'peace-fare' and prioritize restoration for areas on the planet which face intense contamination. According to military officials, who have the support of key political and corporate decision-makers, 'security' and 'peace' are achievable through an infinite pursuit of military prowess. The risks, threats, and 'sacrifice' inherent in the infinite pursuit of the most destructive warfare to deter the 'enemy' are 'minimal' since they reside within 'acceptable' limits. It is true that there is a lack of precise information about the numbers of contaminated sites, the levels of contamination at each site, and the definitive impact of contamination for people and their ecosystem. Yet, there is enough information to counter and invert claims made by U.S. military officials that 'peace-fare' enables them to offer protection, security, or peace.

I identify post-WWII as an important and distinctive marker in the evolution of war making because for the first time in U.S. history the nation remained on permanent war footing. The shift in strategic posture from 'defense' to the 'national security state' was significant since it inaugurated a structural connection between a privately incorporated economy and military ascendancy, which is often referred to as the military-industrial complex. This structural connection enabled the establishment of a permanent war economy, or economic stimulation through military expenditures. Perhaps it is obvious to state that if the industrial fabric of a nation is dependent upon military

investment and expenditure for economic stimulation then it is in the nation's interest to ensure there is always a market for militarism. Yet, what is not always obvious and often concealed are the direct, indirect, and externalized economic and social costs associated with a war economy.

My exploration in chapter one began from the premise of exposing some of the invisible or externalized costs associated with the infinite pursuit of militarization. Military activities have been identified as contributing to the most ecological devastation worldwide and yet have evaded public scrutiny, criticism, and even environmental law. There are independent researchers, regulatory agencies, and grassroots activists working diligently to press the military for more access to their records and for greater accountability. It is probably partially due to their efforts that the Pentagon has officially recognized the need to address the environmental ruin on domestic territory directly attributable to military 'peace-time' missions. Although the Pentagon has also been forced to prioritize environmental restoration in some areas because of the lethal waste that has been surfacing and migrating throughout the soil, water systems, and atmosphere since the inception of their 'peace-fare' missions.

Despite official recognition and the establishment of an 'environmental restoration program', progress is proceeding at a snail's pace. This is because the Pentagon is more committed to glossy brochures bragging of 'milestone achievements' than actually spending the money required to decontaminate sites. In addition, the Pentagon does not have a good handle on where and how much waste its military divisions are generating or no overall picture of its environmental programs. Another roadblock to real environmental re-dress is that Pentagon officials continue to demand

from Congress exemptions from environmental, worker protection, and public safety laws. The most horrifying reality is that for some areas no amount of money or current technical expertise can completely reverse the lethality of contamination that resides in the earth. We are forced to accept the 'sacrifice' of these areas, and any future sites required for 'national security' missions, for generations to come.

Information about the contamination at U.S. foreign installations is not provided by Pentagon, but independent studies have revealed that foreign bases are as polluted as their domestic counterparts. A lack of effective monitoring and enforcement mechanisms permits the U.S. to avoid adding billions of dollars for environmental clean-up to their already staggering tally of estimates. My focus was not on the magnitude of environmental wreckage that the U.S. has generated at their overseas bases, but it stands as an example of their global reach and as another set of environmental debacles from military 'peace-time' missions. In chapter two I traced and recounted some aspects of the U.S. military's nuclear testing at the Marshall Islands to point to their global appetite for destruction. The Pacific region remains a critical strategic military site for the U.S., while indigenous populations are caught in the clutches of infinite militarization.

The world's major armed forces continue their 'peace-fare' missions in the Pacific region, including U.S. missions in Micronesia. The Pacific Islands have been locked into U.S. pursuits to establish military facilities from Alaska to the Antarctic. Micronesia is an area coveted for its position on sea routes to Africa and the Persian Gulf through the Indian Ocean. The U.S. military may have ceased exploding nuclear weapons at Bikini and Eniwetok in 1958, but as I detailed in chapter two there is no end to the contamination and human suffering. In addition, the Pacific remains an important

militarized zone for U.S. 'national security' interests. For example, the U.S. military's first-strike capability and space warfare technological developments (Strategic Defense Initiative) are at Kwajalein Atoll. Owen Wilkes, an independent military researcher, notes that "if the American Pacific Missile Range at Kwajalein were shut down, half the momentum of the global arms race would be lost" (WWFNP, 1987: 36). The U.S. has a complex network of sensors and computers for space tracking, space warfare systems, and anti-missile systems to ward off a nuclear attack. In addition, ballistic missile delivery systems have been fired into the lagoon at Kwajalein Atoll from Vandenburg Airforce Base, 7,500 kilometers away in California, since 1959.

Indigenous populations that use to populate the necklace of islands that make up Kwajalein Atoll have suffered what should only be referred to as nuclear apartheid. To date there have been 10,000 people forced from their homes and relocated to Ebeye Island, which is a mere 66 acres. The people have little access to fresh food, exist with poor sanitation, and have high infant mortality rates. The Marshallese can only enter Kwajalein Island with identification cards and special permission from U.S. officials and all indigenous people must be off the island by nightfall. The lived reality for the Marshallese stands in stark contrast to the middle-class paradise that was created at Kwajalein Island for the 6,000 American 'civilian' employees and their families. As Marshallese people struggle to improve the conditions of slum imposed on them, the American personnel live in expatriate luxury. The U.S. is not willing to relinquish its militarized presence at Kwajalein despite intense opposition from local populations.

The Pacific region exemplifies the pursuit by the world's military powers to use smaller or weaker countries to consolidate their 'forward defense', as a launching pad for

their armies, ships, and aircraft, and as a site for 'peace-fare' activities. The history of the U.S. military in the Pacific entails a harsh reality of colonization based not only military, but also political and economic power. Each dimension of power contributes to an intricate web of dependency and decimation for local populations. By 1983 U.S. trade with Pacific nations outstripped its trade with Europe by one-third (WWNFIP, 1987). It is military control that safeguards trading routes and more than 40 percent of U.S. trade passes through the Pacific. Political power has been exerted by the U.S. beginning with the UN designation of Micronesia as a Strategic Trust Territory (i.e. complete U.S. annexation of islands). It has culminated in the Compact Free Association Agreement, which was designed to give only the impression of independence while maintaining U.S. control over internal and foreign affairs to ensure military jurisdiction of key strategic islands.

My exploration then shifted in chapter three to an analysis of a site in U.S. territory ravaged from 'peace-fare' missions, Rocky Mountain Arsenal. This former military installation has been deemed one of the most toxic sites on earth, and I believe it exemplifies the paradox of 'security' that I have suggested is inherent in military 'peace-fare'. Lethal chemical weapons production and storage has ceased at the Arsenal, but the deadly contamination associated with this production lingers and is migrating away from its sources of 'containment' to continue its assault against the ecosystem and all life that depends on it. In 1987 the Arsenal was placed on the Environmental Protection Agency's National Priorities List, the list of the most heavily contaminated sites on domestic soil. Costs associated with attempted environmental restoration continue to skyrocket while estimates for completion are consistently postponed. RMA stands as a

monumental tragedy on its own, but it is also a terrifying symbol of the other sites where chemical weapons continue to be produced and stored on U.S. soil.

About one billion dollars has already been spent on the 'clean-up' at RMA, but the majority of the funds have been directed toward management activities and preliminary studies. Initially it was believed that environmental restoration could be accomplished by 2012, but has consistently been pushed forward. Moreover, military standards of environmental 'clean-up' often translate into 'neutralizing' contaminated soils or 'capping' them in concrete encased landfills. The Arsenal presents us with the chilling reality that reversing the environmental wreckage in some areas is technically not possible, and therefore we are to accept its 'sacrifice'. The acceptability of the 'sacrifice' of our precious resources and productive land to fulfill the pursuit of military prowess is truly appalling. Yet, it is even worse that the 'sacrifice' made cannot be bound in time or space; future generations must bear the consequences of 'sacrifice' and the 'sacrificed' areas cannot be predictably contained.

Although the U.S. had an 18 year moratorium on the production of chemical weapons on December 16, 1987 the U.S. Army once again began filling artillery shell with chemical agents (Birks, 1991). The new generation of 'binary' chemical weapons contains two chemical compounds, which are mixed in flight to produce nerve gas. Artillery projectiles, battlefield rockets, and cruise missiles were all slated to be modernized as chemical weapons. As I noted in chapter one, chemical munitions continue to be stored at eight army depots in the United States: Lexington, Kentucky; Newport, Indiana; Tooe, Utah; Aberdeen, Maryland; Umatilla, Oregon; Anniston, Alabama; Pine Bluff, Arkansas; and Pueblo, Colorado. The U.S. army admits to storing

at least 40,000 tons of nerve gases in various munitions that are then typically stored in bulk containers inside dirt-covered, reinforced concrete bunkers. Since most of the nerve gases were produced near the end of WWII and throughout the 1950s until the early 1970s, all eight sites currently face the need to dismantle aging and leaking weapons. The communities surrounding these army depots are resisting plans to incinerate chemical warfare because past experiences, for example chemical weapons incineration which took place at Rocky Mountain Arsenal outlined in chapter three, have raised significant health concerns. All of the communities have successfully lobbied support from local politicians to ensure that the Army will consider non-incineration technologies. Yet, there are some cases, for example in Alabama, where the Army plans to burn entire rockets, 30-35 per hour, without ever having proved that it could be done safely. Moreover, as communities face monumental battles against military toxics in their backyards, they are also trying to wage a larger battle against military toxics in anyone's backyard.

In chapter four I reflected more broadly on what makes contemporary war distinctive from earlier eras, and related to this, the factors which have influenced the emergence and prioritization of 'peace-fare' missions, like the ones I provided detail about in the previous chapters. I suggest that there has been an intensification of destruction since the end of WWII, and this can be partially attributed to the relentless pursuit of the most destructive and lethal arsenal of weapons that will 'deter' the external 'enemy'. I also suggest though that the targets of destruction are less 'external' than 'internal', or non-combatants and the ecosystem.

‘Peace-fare’, or the permanent mobilization of a nation’s resources in support of war, has roots in the formation of nation-state and in the industrial revolution. Yet, ‘peace-fare’ took on its current dimensions near the end of WWII when the U.S. shifted its strategic posture from ‘defense’ to ‘national security’. The ‘national security state’ was premised on a permanent war economy and supported by a military-industrial complex. For the first time in history the U.S. remained on permanent war footing, and since we have witnessed an unprecedented disintegration of civil life in favor of a militaristic state. I assert that the direct, indirect, and externalized costs associated with a permanent war economy are not only promoting the non-development of society, but threaten to destroy it. The three previous chapters exemplify some of the costs associated with maintaining an infinite readiness for war, and highlight the magnitude of insecurity evident in the relentless pursuit of lethal destructive forces.

I realize that I concentrated mainly on the desire and pursuit of U.S. military prowess, and in the process only made token acknowledgement of the significant and successful resistance against their efforts to achieve absolute military hegemony. I did not mean to imply that resistance against U.S. militarization has not been monumental or effective, or that the U.S. military is an absolutely impenetrable power structure. My priority was to establish validity in relationship to the lethality of U.S. ‘peace-fare’ missions, and I already felt as though I was forced to omit so many aspects of the stories I chose to recount. Therefore I chose to foreground the attempts of the U.S. military to attain absolute power, domination, and control with a few references to the resistance which has diverted their efforts at times. I could have easily written this thesis about the resistance movements against U.S. military ‘peace-time’ missions.

Power is certainly not all consuming or predictable as allies in pursuit of domination and profiteering from death have different stakes at different times. It can be asserted that where there is power and domination it will be accompanied by a struggle to resist it. I justified prioritizing the pursuit of military prowess and leaving resistance to it in the background because in a way it is symbolic of the monumental feat we do face in our attempts to challenge militarism. The military-industrial complex is not an absolutely impenetrable power alliance among powerful decision-makers in society. Yet, we must consider that in the U.S. the economic base is not promoting peace-making institutions and there exists no well-funded social justice-industrial complex which gathers social interests into political and legal consultative structures to advance security based on the principles of peace and justice. The situation is further complicated because it is not simply the decision-makers that have a significant financial stake in the perpetuation of a war economy. An aspect of the war economy that I did not focus on is the reality that the American investment of billions of dollars in military pursuits has provided employment for a substantial portion of the U.S. workforce. The reallocation of these blue collar workers, who are typically over 45 years old, female, less educated, and largely minority populations, poses a significant obstacle to the conversion of the economic base from war-making to peace-making. Why should low income workers be expected to forgo relatively well-paid employment opportunities with defense contractors if there are no comparable opportunities?

I have pointed to some very important questions that we must now consider about the potential for not only human, but also planetary survival, because war has evolved to a point where it threatens to consume everything and re-generate nothing. I chose to

interrogate the military logic of 'protection' and 'security' through an infinite preparation for domination in war to highlight that military contamination is not simply an issue for the communities living near former or current military installations. Along with an infinite pursuit of military prowess comes infinite lethal contamination and infinite zones of 'sacrifice'. This military logic threatens to encroach on all life, contaminate it and potentially annihilate it. The time to oppose infinite militarization is now; we all have a social responsibility to dedicate a portion of our time and resources to obliterate military domination or else face not simply our own, but perhaps also the planet's annihilation.

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