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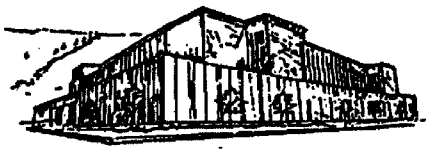

ROCKY MOUNTAIN LABORATORIES: AN INQUIRY INTO COMMUNITY OPPOSITION TO A BIOSAFETY LEVEL IV EXPANSION

by

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Rocky Mountain Laboratories: An Inquiry into Community Opposition to a Biosafety Level IV Expansion

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This study explores the perspectives of community members opposed to a federal biolaboratory expansion at Rocky Mountain Laboratories in Hamilton, Montana. The biolaboratory expansion includes the construction of Biosafety Level IV laboratories, which are facilities equipped to study the most deadly infectious diseases known to man. The biolaboratory expansion is funded by federal bioterrorism research monies so that potential bioterrorist biological agents may be studied in this expanded facility.

High risk hazardous facilities are defined as those that rely on technology and evoke high levels of dread. Community reactions to high risk hazardous facilities, including hazardous waste, nuclear, and mining facilities, have been widely examined. However, community response to biolaboratories, potentially another type of a high risk hazardous facility, has yet to be examined. Thus, the purpose of this study is to explore the degree to which a biolaboratory may be perceived as another type of a high risk hazardous facility. This exploratory study examines if participants' opposition to a biolaboratory reflects previous findings on community response to other types of high risk hazardous facilities.

In-depth interviews with 10 community members opposed to the biolaboratory expansion allowed me to explore their perspectives on this unexamined topic. The data collected from these in-depth interviews were analyzed by content analysis that included two stages: open coding and axial coding. The results of this process revealed that various themes were found to characterize participants' opposition to the biolaboratory expansion. These multidimensional themes included a negative perception of the expansion approval process, distrust in institutional authority, a negative perception of potential risks, and distrust in the justification for bioterrorism research. Unidimensional themes included a negative perception of the equity of expansion and a perceived lack of economic benefits from expansion. However, the extent to which each theme influenced each participant's opposition varied.

Participants' opposition to the biolaboratory expansion was found to reflect other community responses to high risk hazardous facilities. Unlike previously determined community response to high risk hazardous facilities, participants' opposition was characterized by a strong negative perception of the public process and questioning of bioterrorism research. Thus, the results of this exploratory suggest that to some extent community residents perceive biolaboratories as a unique type of a high risk hazardous facility.

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CHAPTER ONE- INTRODUCTION

The terrorist attacks on September 11, 2001 in the United States prompted heightened concern over the safety of the nation. One concern was the possibility that infectious diseases could be used as deadly weapons by terrorists. Shortly after this pivotal event, President George W. Bush approved a $6 billion federal allocation increase for bioterrorism protection (McKee 2002). Of this $6 billion increase, nearly $1.7 billion was designated for the National Institute of Allergy and Infectious Diseases (NIAID) for bioterrorism research since the purpose of the NIAID is to "conduct and support research that strives to understand, treat, and ultimately prevent the myriad of infectious, immunologic, and allergic diseases that threaten hundreds of millions of people worldwide" (NIAID 2004a).

The increased bioterrorism monies will be used by the NIAID to expand research in biolaboratories. In these facilities, scientists can study potential terrorist biological agents, such as anthrax and Ebola. Across the United States, the NIAID is investing the bioterrorism monies in its various intramural and extramural research facilities. Intramural research is conducted by federal scientists at NIAID laboratories in Bethesda and Rockville, MD and Hamilton, MT (NIAID 2004a). The NIAID also supports extramural research, which includes research conducted by non-federal employees in various universities, medical schools, hospitals, and research institutions (NIAID 2004a).

The NIAID will spend a portion of the bioterrorism research monies in the construction and expansion of research facilities. NIAID plans to construct and expand

research facilities have sparked concern in several potentially affected communities, including Boston, MA, Davis, CA, and Hamilton, MT.

This study examines one potentially affected community, Hamilton, Montana, where some residents formed a grassroots opposition against the federal biolaboratory expansion. Since 1927, Rocky Mountain Laboratories (RML) in Hamilton, Montana has pursued infectious disease research funded by the federal government and funneled through its parent agency, the NIAID. The current expansion project at RML, the Integrated Research Facility (IRF), will include a Biosafety Level IV research laboratory. The IRF is funded by the bioterrorism monies appropriated to the NIAID in 2001. The purpose of this study is to describe community opposition during the period of proposed expansion from January 2002 through June 2004 to the IRF project at RML.

Biosafety Laboratories

Currently, there are four classifications of research laboratories operated by the NIAID from Biosafety Level (BSL) I to IV. According to the NIAID (2004b), "scientists use biosafety labs to study contagious materials safely and effectively. These state-of-the art labs are designed to not only protect the researcher from contamination, but also to prevent microorganisms from entering the environment." Each BSL classification is determined according to "laboratory techniques, safety equipment, and design, depending on the types of agents being studied" (NIAID 2004b). With each increasing level, the risk to human health from the agents studied in the laboratory increases, with level IV being the most hazardous (see Appendix A).

Scientists use the most stringent procedures to protect themselves and the public from the deadly diseases studied in a BSL IV laboratory. For example, in a BSL IV

laboratory, scientists wear protective suits that filter the air and multiple levels of security to protect the lab, including security cameras and card reader identification systems that admit only approved personnel (NIAID 2004b). Currently, there are four BSL IV laboratories in the United States; these four facilities are located in Atlanta, GA, Frederick, MD, San Antonio, TX, and Galveston, TX (NIAID 2004b). RML in Hamilton, MT will become the fifth location in the United States with a BSL IV laboratory.

Theoretical Background

High levels of anxiety, such as community concern over the potential impacts of a BSL IV laboratory, may be explained by risk society theory. Risk society theory, as suggested by Ulrich Beck (1992), is based on the idea that risk is manufactured and managed by society. Risks are not increasingly present, but rather society is organized to respond to risk (Irwin 2001). The risk society theory claims that doubt, dread, and uncertainty prevail because society has become consumed with managing complex and obscure risks.

The emergence of the risk society is an outcome of modern, industrial society's success (Irwin 2001). The focus of industrial society has been the production and consumption of goods to overcome scarcity, which is the perceived need or lack of goods (Van Loon 2002). In modern industrial society, continuous technological progress is needed to create more goods for production and consumption. Institutions of the modern society focus on production and consumption; however, latent side effects are unaddressed by established institutions (Van Loon 2002).

The manufactured, latent side effects created by the success of modern industrial society are the "bads" or risks that threaten society and the environment (Van Loon 2002). Risks are "industrially produced, economically externalized, juridically individualized, and scientifically legitimized" (Beck as cited in Irwin 2001:61). Beck (in Van Loon 2002) frequently uses nuclear technology to illustrate the latent side effects of modern society. Nuclear technology has been used to create electric power; however, the nuclear accident at Chernobyl exemplifies how this technology can produce risks that harm society and the environment (Van Loon 2002).

As the risks of modern society have become increasingly recognized, institutions have attempted to focus on not only the production of goods but also the accompanying externalities. The degree of excess "bads" produced by modernity has overwhelmed institutions that in turn can only create more risks for society (Van Loon 2002).

Hence, risks are no longer mere side effects of production and consumption; they have become the central focus of society. The risk society is thus "an epoch in which the dark sides of progress increasingly come to dominate social debate" (Beck in Irwin 2001:50). Class, inequality, scarcity, and other issues are still important; however, risk has become the central focus of institutions. Risks may not affect everyone in society equally since new patterns and inequalities of risk exposure continually emerge (Irwin 2001). According to risk society theory, conflict in society is no longer based on the distribution of wealth but on the distribution of risk. A key focus of the risk society is to manage the manufactured risks that are frequently invisible, ubiquitous, and deadly. Risk society theory seeks to explain why institutions have adopted a heightened concern for regulating risk, especially since many risks are not new.

Risk society theory raises questions about the adequacy of institutions, specifically science and technology, to handle risk. These institutions have a dual role since they not only generate various risks but they also seek to solve and understand risks (Van Loon 2002). As institutions struggle to understand risk by using inadequate tools, they may frequently even amplify risk induced problems (Van Loon 2002). Science is oriented toward understanding "the definition and distribution of errors and risk which are produced by itself" (Irwin 2001:57). Meanwhile, scientific experts are expected to reduce risks; although they frequently fail (Irwin 2001). Therefore, individual citizens are skeptical of scientific experts and are hence laden with the burden of evaluating risk (Van Loon 2002). Thus, managing risks has become a personal and private responsibility. Overall, the risk society is characterized by a loss of faith in institutions and experts to effectively manage and respond to risks.

The threat of infectious diseases, especially those spread through bioterrorism, may thus be understood through the risk society theory. Like risks produced from industrialized production, emerging infectious diseases evoke dread and fear. As a latent side effect of industrial production, such diseases can be distributed globally by mass transportation systems. Infectious diseases are unpredictable, difficult to control, and highly lethal. If infectious diseases were to be used by terrorists as weapons, the outcome could be disastrous. Concern about bioterrorism has propelled the need for research on potential terrorist weapons in biolaboratories. Thus, consistent with the risk society, risk has become institutionalized. As bioterrorism research is institutionalized, scientists in biolaboratories have begun to examine how to control and cure potential bioterrorist weapons. Thus, society can better respond to potential bioterrorism risks.

However, biolaboratories have a dual role according to the risk society theory. On one hand, biolaboratories will allow scientists to understand bioterrorism weapons; simultaneously, biolaboratories also generate various risks. In a risk society, "the technosciense cannot be constrained within laboratories, even if safely sealed off in biohazard phase-four labs" (Van Loon 2002:142). Can biolaboratories properly contain potential bioterrorism diseases? Can technology and scientific experts manage potential bioterrorism diseases? Thus, the risk society theory raises questions about the adequacy of biolaboratories to handle risk.

Biolaboratories: A New Species of Trouble?

Erikson (1994) has suggested that society is plagued by a "new species of trouble." According to Erikson (1994), technology designed to protect society from "natural disasters" has created a whole new category of "technological disasters". Technological disasters are unique because they are created by humans and thus preventable. Erikson (1994) suggests society is increasingly enduring more technological disasters that involve radiation and chemical accidents and other toxic emergencies. Natural disasters, such as hurricanes or earthquakes, have a distinct beginning and ending, whereas technological disasters are endless and without boundaries. Therefore, these technological disasters provoke dread and uncertainty. Hence, are biolaboratories becoming a "new species of trouble"? The purpose of this study is to explore the degree to which a biolaboratory is perceived to be a high risk hazardous facility by some community members of Hamilton, Montana.

CHAPTER TWO- HISTORICAL BACKGROUND

RML occupies 66 acres of a residential neighborhood in Hamilton, Montana. The purpose of RML is to conduct research to "understand, treat, and ultimately prevent the myriad of infectious, immunologic, and allergic diseases" that threaten society (NIAID 2004a). Why is a federal biolaboratory located in the remote state of Montana, many miles from a large research center or city?

The Early Days 1880 through 1910

In the late 1880s, a strange, new illness Rocky Mountain spotted fever, which is commonly shortened to "spotted fever", infected early settlers of the Bitterroot Valley in western Montana (Harden 1990). The illness was not a widespread problem until the 1890s; however, the first documented case most likely occurred in 1882 (Harden 1990 and Philip 2000). Spotted fever was most prevalent from 1900 to 1910, when 141 cases were reported in the Bitterroot Valley (see Appendix B). At this time, the illness was not recognized as a distinct disease and was frequently given various names including measles, black measles, black typhus fever, mountain fever, and fever (Philip 2000). Although spotted fever was later discovered to be caused by a *rickettsia,* a bacteria carried by ticks, at the time Ravalli and Missoula County Boards of Health believed that it resulted from a parasite in melting snow water (Philip 2000).

The symptoms of spotted fever begin a week or two after the victim has been bitten by a tick, and the onset of the symptoms can either occur suddenly or emerge slowly (Harden 1990). The first symptom of the disease is a headache followed by pains in the back, joints, and legs; the eyes are sensitive to light and often a stiff neck occurs

(Harden 1990). Additionally, the patient develops a fever, cannot sleep well, and is very restless (Harden 1990). Spotted fever is also characterized by a rash that covers the entire body; however, in severe cases victims may die before the rash appears (Harden 1990). Victims that have recovered from spotted fever in the Bitterroot Valley usually have been sick for approximately two weeks (Harden 1990).

In 1902, Louis B. Wilson and William M. Chowning were the first researchers to investigate the disease (Harden 1990). They compiled a comprehensive list of the number of cases in the Bitterroot Valley by examining newspapers and requesting records from area doctors (Harden 1990). Wilson and Chowning found that at least 88 cases were reported between 1895 and 1902 in the valley (Harden 1990). Although the number of cases concerned residents, doctors, and public health officials, a more troubling aspect of the disease was its high mortality rate of over 70% (Harden 1990). Additionally, Wilson and Chowning found that most of the cases of spotted fever occurred between 15 May and 15 June and most frequently occurred in healthy males aged 20 to 40 years (Harden 1990).

Wilson and Chowning also discovered that all of the reported cases of spotted fever occurred west of the Bitterroot River. Proximity to the foothills was also a factor; as one resident commented, "exposure or residence on the 'bench' might for some reason be more dangerous than in other near places (of the river) because of the difference in the development" (Harden 1990:26). The majority of the spotted fever cases occurred "near western fringes of the Bitterroot Valley from Lost Horse Creek in the south to Lolo Creek in the North" although cases were also found across western Montana, specifically in Missoula and Granite Counties (Philip 2000:59).

Beyond the state of Montana, spotted fever also occurred in other western states including Idaho, Oregon, Wyoming, Washington, Utah, Nevada, California, and Colorado (Harden 1990). In most cases, the disease was not severe and rarely deadly, so that it was never investigated by public health officials. However, the unique severity of spotted fever in the Bitterroot Valley motivated the State of Montana Board of Health to support fever research by recruiting Wilson and Chowning from Minnesota (Harden 2000). The future of spotted fever research in western Montana would henceforth continue to be dominated by non-local experts. By 1909, Howard Taylor Rickets, a young scientist from The University of Chicago, discovered that the infectious agent of spotted fever was carried by ticks (Philip 2000). Rickets' quest to develop a vaccine for the disease was hampered by funding delays from the state of Montana; in 1910, Rickets died from typhus in Mexico and vaccine development was halted (Philip 2000).

Spotted fever and development 1890 through 1920

The impact of spotted fever on the development of the Bitterroot Valley was widespread and lengthy. Once spotted fever was identified as a specific disease of the Bitterroot Valley, the future of economic development in the area was of great concern to residents and developers. As Harden (1990:22) noted "this dread disease seemed a particularly cruel blight on the future development of one of the most beautiful Valleys in the western United States." Efforts were made by local development supporters to ignore the disease. For example, in 1904, all subsequent spotted fever deaths were not distinguished from other illnesses in local newspaper obituaries (Harden 1990).

From the late 1890s until the 1920s, economic development in the Bitterroot Valley was primarily based on logging and apple orchards. Railroad construction

between 1887 and 1888 linked the Bitterroot Valley's abundant timber to outside markets, and the resulting logging boom occurred directly after completion of the railroad (Philip 2000). During the logging boom, large trees of value were removed while slash remained behind because it was costly, laborious to remove, and lacked market value (Philip 2000). By 1899, a total of 500 million board feet was cut from the valley and shipped to the Anaconda Copper Mining Company to fuel mining operations in Butte and Anaconda, Montana (Philip 2000). In 1890, the Bitterroot Development Company (BRDC) was formed and supported by the owner of Anaconda Copper Mining Company, Marcus Daly (Philip 2000). To support the vast amount of timber harvested in the Bitterroot Valley, the BRDC built a new sawmill in Hamilton in 1890 (Philip 2000).

In the early 1890s, new apple orchards were planted in the cleared lands west of the Bitterroot River because land developers claimed the valley provided optimal growing conditions for apple trees. Between 1895 and 1896, nearly 50,000 apple trees were planted (Philip 2000). The Bitterroot District Irrigation Company provided water for agricultural lands by building the "big ditch canal", a system beginning at the constructed Lake Como dam south of Hamilton (Philip 2000:95).

Spotted fever threatened railroad and orchard development in the Bitterroot Valley. The Northern Pacific Hospital room in Missoula, Montana was made available for Wilson and Chowning (Harden 1990). Harden (1990: 25) noted that "the railroad company was eager to assist in the spotted fever investigations, because the expansion of its rail lines into Idaho was jeopardized by the disease, as was its supply of lumber for ties from the Bitterroot." Developers from Chicago sold orchards by advertising in Chicago newspapers, and their profits were threatened by the disease.

Spotted fever negative publicity threatened growth in the Bitterroot Valley. In 1907, land prices in the Bitterroot Valley ranged from $100 to $150 an acre; by 1921, in some areas of the valley, land prices had dropped to $15 an acre (Harden 1990). Real estate salesmen from Chicago emphasized that the disease was located only west of the river to "minimize the impact of spotted fever on land sales with tangible proof that the entire valley was not affected" (Harden 1990:63). Ironically the very emergence of the disease could have resulted from the valley's growth and economic development, since cleared land may have provided optimal conditions for the probable increase in small animals and ticks.[1]

By 1913, progress in understanding and controlling spotted fever in rural Montana was hindered because of a power struggle between entomologists and physicians. The battle between these two professional groups revolved around the unanswered question: was spotted fever an insect problem or a human problem? The Montana State Board of Entomology was established in 1913 and immediately began disease prevention and eradication efforts (Harden 1990). The physicians and entomologists agreed to divide the Bitterroot Valley into two sections, one for entomologists and the other physicians (Harden 1990). Between 1911 and 1920, the main focus of both groups of professionals was tick eradication that was attempted by "dipping" livestock in arsenic baths to remove ticks and by killing rodents with poison (Harden 1990). In 1913, local ranchers' resentment of livestock dipping programs was highlighted by the destruction of two dipping vats in the Bitterroot Valley (Philip 2000). Tick eradication efforts decreased the

[1] The increased occurrence of spotted fever coincided with railroad construction, logging, and homestead development. Philip (2000:55) suggests that the "development of the outbreak and its subsequent decline were greatly influenced by the events and environmental changes associated with settlement of the Bitterroot Valley."

number of ticks in the Bitterroot Valley; however, the disease remained rampant in the mountain canyons (Dr. Huber, pers.comm.[2]).

RML 1920 through 1940s

In 1921, State Senator Tyler Worden and his wife, Carrie, the President of the Montana Federation of Women's Clubs, died from spotted fever near Lolo, Montana (Kalisch 1973). The loss of this prominent couple caused a huge uproar in Missoula and the Bitterroot Valley (Dr. Huber, pers.comm.). Dr. Parker, with the aid of several Missoula and Bitterroot Valley organizations, appealed to the Montana Legislature for increased spotted fever research funds (Dr. Huber, pers.comm.). As a result, an abandoned schoolhouse near Hamilton was obtained by the state for spotted fever research.

In 1925, a vaccine for the disease was created by U.S. Public Health physician Roscoe R. Spencer and Montana entomologist Ralph R. Parker at the Hamilton facility (Harden 1990). The vaccine was made from ground-up ticks infected with spotted fever. In 1925, 34 people were inoculated with the vaccine, and they experienced only minor side effects (Harden 1990). The following year, 400 people were inoculated; the vaccine didn't protect people from acquiring the disease, but it did decrease disease severity (Harden 1990).

Vaccination production in the transformed schoolhouse was very dangerous. Moreover, the facility was inadequate for hazardous vaccine production. At the time, the laboratory employed 16 staff; during the previous five years, 11 of the workers had developed spotted fever or tularemia, another tick borne disease most likely obtained

[2] All sources who were interviewed as background informants on the history of RML have been assigned pseudonyms to insure their anonymity.

from laboratory rabbits, guinea pigs, and other small animals used to produce the vaccine (Dr. Huber, pers.comm.). Two staff members died from spotted fever, and one died from tularemia (Philip 1990).

With the support of the Montana State Board of Entomology, in 1927 the Montana Legislature appropriated $60,000 for new laboratory construction (Harden 1990). Once funding became available, the next concern was: where should the laboratory be located? Laboratory employees wanted it built at the University of Montana since Missoula was larger than Hamilton and Roscoe R. Spencer argued "the infected ticks posed no threat to the campus" (Harden 1990:139). However, the Montana State Board of Entomology wanted the facility closer to the Bitterroot Valley. The board's position prevailed when the Hamilton Chamber of Commerce purchased land in Hamilton and donated it for the new laboratory (Harden 1990).

Some residents in Hamilton opposed the new laboratory construction. Residents of the Pine Grove addition, where the laboratory was eventually built, did not want it in their neighborhood. As soon as the announcement was made, "there was an outcry" by residents in the Pine Grove neighborhood (Philip 2000:152). Opponents claimed that building the laboratory on the east side of the river, where spotted fever did not exist, would spread the disease and decrease property values. The April headlines of *Western News* declared opponents "Don't Want East Side Tick House" (Philip 2000). The Bitterroot Irrigation District filed a lawsuit that represented 400 owners of irrigated farm land. However, the case was dismissed and the laboratory was constructed (Philip 2000). In 1928, the laboratory construction was completed (Philip 2000).

Although opponents failed to stop laboratory construction, the new building emphasized "containment" as recommended by concerned community members (Philip 1990). Improvements included rounded corners to eliminate tick hiding places and a chain-link fence and moat surrounded the property "to prevent escape of ticks and trespass by animals and small boys" (Philip 1990:153-4). Vaccine production was confined to the third floor, and regulations for entering the facilities were established (Philip 1990). After the laboratory construction, additional safety improvements were made to fix several problems. For example, ticks escaped from non-sealed windows and the air ventilation system spewed ticks out of the laboratory, thus window and ventilation replacements were installed (Dr. Huber, pers.comm.). In one incident, laboratory monkeys escaped from their cages, existed through an open window, and climbed into cedar trees on RML property (Dr. Huber, pers.comm.) Therefore, new monkey-proof locks were used to secure the cages.

In 1932, spotted fever appeared in the eastern part of the United States; suddenly, vaccine production became a nation-wide concern. As a result, the federal government purchased the laboratory from the state of Montana and incorporated it into the Public Health Service (Philip 1990). An additional building was completed in 1934, and the facility was officially named Rocky Mountain Laboratory (Philip 1990). In 1937, RML became part of the National Institutes of Health (NIH).

Expansion of the facility continued when 26 acres were bought in 1938 to serve as a buffer zone between the laboratory and residential neighborhoods (Philip 1990). In 1939, a third building, a 100-foot smokestack for the oil-heating plant, and two residences, for RML scientists Dr. Parker and Dr. Cox, were constructed (Ravalli

Republic 1939). After the expansions were completed, RML was described as "the best-equipped biological laboratory unit in the United States" (Ravalli Republic 1939). It included air-conditioning and "every modern factor for science workers" (Ravalli Republic 1939). At the time, it was the second largest government owned public health facility in the world (Ravalli Republic 1939). Additionally, a fourth building was completed the following year (Philip 1990). During this period, RML employed 116 people who studied various tick and insect born diseases (Philip 1990). The laboratory, with the exception of vaccine production areas, was open to the public and visitors frequently toured the facility (Dr. Huber, pers.comm.). Local residents used the RML library and children visited their parents there after school (Dr. Huber, pers.comm.).

In 1938, RML scientist Dr. Herald Cox discovered that spotted fever could be grown in yolk sacs of embryonic chicken eggs; thus, the dangerous method of vaccine production from ground-up infested ticks was discontinued (Philip 1990). During World War II, RML produced yellow fever, typhus, and spotted fever vaccines for the U.S. military forces (Dr. Huber, pers.comm.). In 1949, RML director Dr. Parker died at a time when spotted fever was diminishing across the country. As the "Parker era" of spotted fever research was ending, the future of RML was unclear (Dr. Huber, pers.comm.).

RML 1950s through 1980

In the 1950s, RML experienced massive changes. The NIH had established another research center with a practical research focus; therefore, the NIH needed RML to shift from practical to basic research (Dr. Huber, pers.comm.). In 1955, the NIH established a branch called the National Microbiological Institute which subsequently was renamed the National Institution of Allergy and Infectious Diseases (NIAID), and

RML became its largest field laboratory that was mandated to study infectious and tropical diseases (Philip 1990). The new director, Carl Larson, brought new people to RML and expanded the laboratory's research agenda (Dr. Huber, pers.comm.; Dr. Morgan, pers.comm.). Although the laboratory continued to focus on diseases contracted from ticks, general confusion about the direction of RML prevailed (Dr. Huber, pers.comm.; Dr. Morgan, pers.comm.). New, basic scientists from fields such as microbiology and molecular biology began studying tuberculosis, whooping cough, rabies, and other related diseases (Dr. Huber, pers.comm.; Dr. Morgan, pers.comm.). Overall, the research direction at RML changed from one that was field oriented to one that was grounded in the basic scientific research of infectious diseases (Philip 1990).

Research at RML continued to expand during the 1960s without major improvements to laboratory equipment and other resources (Dr. Morgan, pers.comm.). Scientists were allowed to work in many different disciplines, but research was often conducted in very "primitive conditions" (Dr. Morgan, pers.comm.). Public access was still available in designated areas; for example, local high school students used the library for schoolwork (Dr. Morgan, pers.comm.). Safety remained a concern at the laboratory. One former scientist described how laboratory infections were common and almost "everyone eventually got Q fever" (Dr. Morgan, pers.comm.).[3] Local laundry workers, who were employed outside of the laboratory, became sick with Q fever from contaminated laundry (Dr. Huber, pers.comm.). Safety precautions at the laboratory continuously evolved and improved, in part guided by lessons learned from these events.

[3] The respiratory disease, *Rickettsia burneti*, commonly called Q fever, is transmitted from infected laboratory animals. It is highly infectious and causes flu-like symptoms (Philip 2000). Although RML employees received a vaccine as protection against the disease, many still contracted Q fever (Dr. Huber, pers.comm.).

In the 1970s, RML experienced major changes in research programs and staff. During this time, "out moded methods of research at the lab were done away with and the scientific staff underwent a major turnover" (Wiens 1982). The administration was "reinvented", as efforts were made to bring the laboratory "into the cutting edge" of science (Dr. Morgan, pers.comm.). At this time, tick research at RML was minimized. (Dr. Morgan, pers.comm.). RML was expanded and upgraded; workers were formed into three separate research departments (Dr. Morgan, pers.comm.). A group of scientific counselors made annual visits to review and determine how research should progress at the laboratory (Dr. Huber, pers.comm.; Dr. Morgan, pers.comm.). Nearly half of the staff changed at RML, some through retirements, and through the hiring of "new, younger scientists" (Wiens 1982). The new trend at the laboratory was to have a few tenured scientists and many short-term, post-doctorial researchers (Dr. Morgan, pers.comm.). As a result, new people arrived to work at RML for shorter periods of time and were less involved with the local community (Dr. Morgan, pers.comm.).

RML 1980 through early 2000

In 1982, federal laboratory officials declared that the future of RML was optimistic, "despite rumors to the contrary" (Wiens 1982). At the time, the laboratory was facing major funding cutbacks, but federal officials "refuted fears that the lab in Hamilton would eventually be phased out of operation" (Wiens 1982). However, one year later, a laboratory closure proposal threatened the future of RML (Towslee 1983a). The Grace Commission, which evaluated government spending, recommended the closure of RML and the transfer of its research activities to the NIH headquarters in Bethesda, Maryland (Towslee 1983a). According to the Grace Commission, the closure

of RML with its 130 employees would save the federal government $14.1 million over three years (Towslee 2005b). The commission cited other reasons for closing RML including the laboratory's isolated location, its trouble attracting scientists, high travel expenses, a lack of nearby facilities, its redundant research, and a lack of educational opportunities for scientists (Towslee 1983a).

The potential shutdown of RML was opposed by the Montana congressional representation, local government officials, scientists, and local citizens (Dr. Johnson, pers. comm.). Defenders of RML emphasized its research accomplishments, its beneficial employment for the community, and the potential costs of relocating the laboratory (Towslee 1983a and Wiens 1983). As a result, the Grace Commission withdrew its closure recommendations (Dr. Johnson, pers. comm.).

Suddenly, RML not only survived potential closure, but funding was available for expansions and upgrades (Towslee 1983b). During this time, new laboratory branches were formed; consequently, the Rocky Mountain Laboratory was officially renamed Rocky Mountain Laboratories to represent the various research foci; however, the acronym RML remained (Dr. Johnson, pers. comm.). RML's historical tick and vector borne research was de-emphasized and the worlds' largest collection of tick was transferred from RML to the Smithsonian Institution in Washington, D.C. (Dr. Johnson, pers. comm.). The 1980s was also a period of drastic safety improvements at the facility because general scientific knowledge of experiment safety had led to codifying safety equipment, procedures, and laboratories (Dr. Johnson, pers. comm.). For example, the implementation of federal codification of biosafety levels regulated laboratory experiments (Dr. Johnson, pers. comm.). Additionally, biological safety cabinets, which

are steel compartments with filtered air that contain experiment agents, were built at RML (Dr. Johnson, pers. comm.).

In the mid-1990s, some of the RML buildings did not meet federal safety codes; therefore, several buildings were remodeled and another new building was constructed (Dr. Johnson, pers. comm.). The laboratory already operated at BSL I and II, but additional BSL III laboratories were built in the late 1990s (Dr. Johnson, pers. comm.). In 1995, the bombing of a federal building in Oklahoma City impacted safety practices at RML. As a federal facility, RML safety measures were evaluated, and the subsequent events of September 11, 2001 provided funding for increased security measures (Dr. Johnson, pers. comm.). Consequently, shortly after the terrorists' attacks, a fence was constructed around the RML facility (Dr. Johnson, pers. comm.). Security was also increased at the laboratory, with security personnel guarding the laboratory entrance and restricting public access (Dr. Johnson, pers. comm.).

Integrated Research Facility Expansion

Research, organization, and safety practices have evolved at RML over the past 80 years. Currently, the NIH consists of 27 institutes and centers, including the NIAID (Dr. Johnson, pers. comm.). The NIAID intramural research branch includes federal scientists at RML, Bethesda and Rockville, Maryland, and small units abroad (Dr. Johnson, pers. comm.). RML is organized into five departments including the laboratory of human bacteria pathogenesis, intracellular parasites, persistent viral diseases, veterinarian branch, and administration/ facility management (Pekoc 2004:11).

In 2002, construction of the Integrated Research Facility (IRF) was proposed. As proposed, it included BSL IV research facilities and the $66.7 million construction of a

100,000 square foot building (NIAID 2004b). During the past 80 years, RML has existed in Hamilton without any community-wide conflict, except for initial opposition to the laboratory construction in 1927 (Dr. Huber, pers. comm.; Dr. Johnson, pers.comm.; Dr. Morgan, pers. comm.). However, the IRF sparked opposition, and many citizens have voiced concerns against the BSL IV laboratory.

According to the NIAID, the construction of the IRF is needed to accomplish RML's expanded mission. The NIAID's mission has been expanded to "include basic and applied research aimed at addressing specific issues outlined in the national bio-defense response plans" (NIAID 2004c). The NIAID has received an additional $1.7 billion congressional allocation, the largest budget increase in the institution's history to study "agents of bioterrorism" and make the "country better prepared" to reduce the impact of potential bioterrorist attacks (NIAID 2004c). Additionally, the expanded facilities are expected to "help develop new diagnostics, vaccines, and treatments for diseases caused by emerging infections and the intentional release of an infectious agent into a civilian population" (NIAID 2004c).

As proposed, the IRF would make RML the fifth operational BSL IV laboratory in the United States. Other BSL IV facilities are currently located at the Centers for Disease Control and Prevention in Atlanta GA, the United States Army Medical Research Institute for Infectious Diseases at Fort Detrick in Frederick MD, the Southwest Foundation for Biomedical Research in San Antonio TX, and the University of Texas at Galveston TX (NIAID, 2004b). The cities currently hosting BSL IV laboratories have populations ranging from 52,247 to over one million (see Table 1). These four operational BSL IV laboratories are located in metropolitan counties; Ravalli

County would become the first nonmetropolitan location for a BSL IV laboratory in the United States. The population density in the counties where BSL IV laboratories are currently located is between 912 and 2,964 persons per square mile. In comparison, Ravalli County has a population density of only 18 persons per square mile.

Table 1. Population of BSL IV host cities and counties in the U.S. (Source: U.S. Census 2000).

BSL IV location	Host City	Host City Population	Host County	Host County Population per square mi
Centers for Disease Control & Prevention	Atlanta, GA	416,474	DeKalb Co.	2,519
Rocky Mountain Laboratory	Hamilton, MT	3,705	Ravalli Co.	18
Southwest Foundation for Biomedical Research	San Antonio, TX	1,144,646	Bexar Co.	1,011
University of Texas	Galveston, TX	52,247	Galveston Co.	627
U.S. Army Medical Research Institute for Infectious Diseases	Frederick, MD	52,767	Frederick Co.	912

Construction of the IRF at RML would include laboratories, offices, conference rooms, a lunch room, animal quarters, mechanical space, and a waste handling area (NIAID 2004c). Several laboratories that would operate at the BSL IV level would encompass 6,800 square feet of the entire 100,000 square foot facility. The BSL IV laboratories would be surrounded by a corridor, which would provide a "buffer between the lab and exterior" (NIAID 2004c). The two year construction project would include nearly 200 workers during peak construction (NIAID 2004b). Payroll from the two year

construction project is expected to reach $4.7 million that would produce a total of $18.9 million in local economic activity (NIAID 2004b).

RML would also hire new employees to work in the expanded IRF. These jobs would encourage more economic activity in the rapidly growing valley. During 1990 to 2000, Ravalli County experienced a 44.2% increase in population, the largest county-wide population growth rate in Montana for the decade (U.S. Census 2000). Currently 255 people, 77 of whom have doctoral degrees, are employed at RML with an average salary of $41,600 (FitzSimmons 2004). Meanwhile, the average per capita income in Montana is significantly less at $17,151 (U.S. Census 2000). Once the IRF opens, an expected 100 new employees would work at RML and bring an additional 245 residents to the Hamilton area (FitzSimmons 2004). An influx of new residents could increase business and real estate earnings for the surrounding area. The payroll for the new employees might amount to $6.6 million annual additional earnings to the current $10.4 million payroll (FitzSimmons 2004). For every 100 RML jobs, an estimated 40 jobs would be created in Montana and for every $1 million in RML salaries, $600,000 in the state-wide economy would be generated (Pekoc 2004).

Furthermore, RML is a key contributor to the biotechnology industry that is an important sector in the Montana economy. Concentrations of biotechnology facilities in the state are about twice the national average (FitzSimmons 2004). In Montana, 110 biotechnology businesses were operating in 2004, and the industry experienced a 22% growth rate from 1990 to 2000 (FitzSimmons 2004). The number of people employed by the biotechnology industry could double in the next five to 10 years (FitzSimmons 2004).

IRF approval process

Once the IRF at RML was publicly announced in January 2002, community opposition formed. The IRF approval process began in January, 2002 when the proposed expansion facility was announced. A detailed timeline of the major events occurring during the approval process is described in Table 2.

Table 2. IRF approval process timetable (Source: Compiled from newspaper articles, opposition group websites, and meeting video recordings).

Date	Event
January, 2002	IRF proposal announced
February, 2002	RML public meeting about proposal
Summer, 2002	New opposition group formed
September, 2002	Environmental Assessment released
October, 2002	First RML Community Liaison Group meeting
January, 2003	RML Town hall meeting
April, 2003	RML open house
May, 2003	Draft Environmental Impact Statement released
June, 2003	Opposition groups' public meeting
	RML public comment meeting
July, 2003	RML public comment meeting
September, 2003	RML public comment meeting
December, 2003	RML Town hall meeting
	Supplementary Draft Environmental Impact Statement released
April, 2004	Final Environmental Impact Statement released
	One opposition group filed lawsuit against NIH for Freedom of Information Act violation
June, 2004	RML Record of Decision released
August, 2004	Opposition groups' lawsuit filed against NIH to stop lab construction
September, 2004	Settlement reached

Approximately a month after the announcement, RML hosted a public meeting about the proposal. The following summer, concerned citizens opposed to the laboratory expansion formed a new non-profit organization that collaborated with two previously

established organizations[4]. In September 2002, an environmental assessment was released to the public by the NIAID, and the following month the first monthly meeting for the RML Community Liaison Group (CLG) was held. This group of 25 community members was formed by RML to "promote collaboration and cooperation between RML and the community" (RML CLG meeting notes 2002). CLG members were charged with communicating concerns from the community to RML and to NIAID, and to disseminate information from the laboratory to the community.

RML hosted a town hall meeting and open house in early 2003 to disseminate information about the laboratory expansion. After receiving public comments, the NIAID announced that the environmental assessment was not adequate and therefore an Environmental Impact Statement (EIS) had to be conducted. The EIS generated over 100 public comments from the community (Farrell 2003).

After public comments were submitted for the first EIS, a second EIS draft was released in December 2003. Again citizens had another opportunity to voice concerns. RML hosted several public meetings and opposition groups also sponsored at least one public meeting. In December 2003, a supplementary EIS was released. After a shorter comment period, the NIH released the final EIS in April 2004. One opposition group filed a lawsuit in which they claimed that the NIH had violated the Freedom of Information Act by withholding requested internal documents; the opposition group won the lawsuit and therefore the documents were released.

Despite community opposition efforts, the NIH officially approved the laboratory IRF in June 2004. The agency had determined that the IRF expansion would provide the

[4] The names of the three opposition groups involved with the IRF expansion are not identified to insure confidentiality of these organizations and their members.

most benefit from public funding and noted that RML is "historically strong in vector-borne expertise, which is unmatched at any other site" (NIAID 2004c). Additionally, the NIH concluded that the IRF expansion would have no negative effects or increased risks to the environment, citizens, and community. The NIH's position supports its claim with the fact that there has never been a community release of biological agents from any BSL IV facility (Farrell 2003).

After the IRF was approved, opposition groups filed a joint lawsuit against the NIH to stop the IRF construction. The judge denied the plaintiffs a trial and ordered mediation, which resulted in a settlement agreement. Compromises from the mediation included the agreements that RML would submit a list of research pathogens to Ravalli County doctors, that pathogens would not be used as biological weapons, and that all safety related incidents would be reported to safety officers inside and outside of laboratory (McKee 2004). Additionally, a backup isolation room outside the BSL IV at RML would be built 75 miles away to be used if an accident or pathogen release occurred. Finally, the laboratory would discontinue incinerating non-medical waste by the fall of 2005 (McKee 2004).

Summary

The unique severity of spotted fever in the Bitterroot Valley is why RML was established in the rural state of Montana. Since RML began as a research facility for spotted fever, it has become a highly technological facility equipped to study deadly infectious diseases (see Table 3). Additionally, the organization and safety features at RML have continually changed. The expanded organization at RML, including an increased numbers of employees, buildings, and research foci, has created a large, formal

bureaucracy. Furthermore, it is a bureaucracy primarily managed by non-local federal employees. In addition, the institution is now charged with the new responsibility of managing bioterrorism research. Thus, the IRF expansion will become another layer of RML's bureaucracy.

Table 3: RML historical events (Source: compiled from newspaper articles, books, and personal communication)

Date(s)	Event(s)
1880s	Spotted fever emerges as a widespread problem in the Bitterroot Valley
1902	Spotted fever research begins in the Bitterroot Valley
1921	Old schoolhouse near Hamilton established as a spotted fever research facility
1925	Spotted fever vaccine created; 16 staff employed at the research facility
1927	Construction of a new laboratory facility in Hamilton
1932	Federal government purchases laboratory from the state of Montana; laboratory apart of the Public Health Service
1934	New laboratory building constructed; laboratory officially named Rocky Mountain Laboratory
1937	RML becomes apart of the National Institutes of Health (NIH)
1938	3rd building and 2 houses constructed
1940	4th building constructed; 116 employees at RML
1955	NIH creates a new branch, the National Institutes of Allergy and Infectious Diseases (NIAID) that subsequently includes RML
1970s	RML facility upgrades and 3 new research departments created
1983	RML closure threat by the Grace Commission
1983-1989	Rocky Mountain *Laboratory* name changed to Rocky Mountain *Laboratories*; biosafety laboratories codified
1990s	BSL III laboratories installed
2001	Security increased and RML closed to the public; 255 employees at RML
2002	Integrated Research Facility (IRF) proposed
2004	IRF approved

Improved safety measures at RML have created a research facility that is currently more dependent on technology; however, it has become safer for infectious disease research (Dr. Huber, pers. comm.; Dr. Johnson, pers. comm.; and Dr. Morgan, pers.comm.). For example, deadly accidents have not occurred since the era of spotted fever research during the early 1900s. The recent safety measure to restrict public access has reduced the potential risks of outsider intervention at RML. However, restricted

public access has also decreased its transparency, so that safety measures within RML remain unknown to the public.

RML has presented several problems for Hamilton, including its initial construction, potential closures, and accidents. Community-wide opposition to plans at RML has occurred twice, including opposition to the initial construction of the facility. More recently, the IRF expansion project has sparked a grassroots opposition and such rural opposition to biolaboratories has not yet been studied. The next chapter will review the literature to provide a background of key factors influencing community opposition to high risk hazardous facilities.

CHAPTER THREE- LITERATURE REVIEW

Community response to the siting of high risk hazardous facilities, including nuclear power plants, nuclear incinerators, toxic waste landfills, and mining operations have been widely examined in the sociological literature. Studies most frequently examine community response to hazardous waste landfills because a high level of public dread is associated with such facilities. Also, most studies of high risk hazardous facilities in rural communities have focused on hazardous waste because of the high proportion of proposed sitings or successful sitings of hazardous waste facilities in rural areas. These facilities have been sited, or proposed for siting, primarily in rural areas where population density is low and large expanses of open land are available at relatively low prices. Additionally, rural communities that encourage local growth promotion as a solution to economic decline are frequent candidates for a hazardous waste facility siting (Bohon and Humphrey 2000). Consequently, rural areas have increasingly become a repository for the undesirable waste industries created by society (Fitchen 1991).

The findings from high risk hazardous waste studies have been used to inform other high risk technological projects, including gold cyanide mining (Richards and Brod 2004) and limestone mining (Eser and Luloff 2003; Steeman and Carmin 1998). Although mining projects may not be as dreaded as hazardous waste, they are still perceived to be high risk endeavors.

High risk hazardous facilities have been defined as projects that rely on technology and involve uncertain risks. Frequently, new technology is used in high risk

hazardous facilities to contain waste, extract minerals, and create energy. Uncertain risks associated with high risk hazardous facilities include potential technological failures which could threaten public health and the environment. Thus, high risk hazardous facilities evoke dread. Community support and opposition to high risk hazardous facilities have been analyzed by examining the perceptions of individuals. Resident perceptions in high risk hazardous facility operating and siting communities have been compared to resident attitudes in baseline, non-high risk hazardous facility locales.

Biolaboratories may be perceived by community residents as another type of a high risk hazardous facility. Biological agents found in biolaboratories, particularly those that may be used for bioterrorism and are untreatable, are most likely to be perceived as dreadful as hazardous waste. Like high risk hazardous facilities, biolaboratories rely on new technology to contain infectious diseases and involve uncertain risks if the agents were to be released. However, biolaboratories as another perceived type of a high risk hazardous facility have not yet been investigated.

Costs and Benefits of High Risk Hazardous Facilities

Residents facing the proposed siting of a high risk hazardous facility in their community have to evaluate the possible benefits and costs associated with these new institutions. Frequently, residents' beliefs that the potential costs outweigh the benefits spark community opposition. Thus, many siting attempts have failed because of strong local resistance. Community opposition to "locally unwanted land uses" or LULUs is frequently labeled as the "not in my backyard" or NIMBY syndrome. The NIMBY syndrome suggests that while community members acknowledge the need for high risk hazardous facilities, they do not want such institutions located near their particular

community (Fitchen 1991; Portney 1991). However, the NIMBY label does not differentiate the various types of opponents because some people may oppose the siting of these facilities in anyone's backyard and not just their own (Luloff, Albrecht, and Bourke 1998). Although the NIMBY label is frequently used to describe opposition to LULUs, other complex and interconnected factors may determine residents' attitudes.

Opposition to siting high risk hazardous facilities has been a major topic of rural sociological research in the last 20 years (Benford, Moore and Williams 1993; Bohon and Humphrey 2000; Erickson 1994; Jenkins-Smith and Kunreuther 2001; Hamilton 1985; Krannich and Albrecht 1995; Sjöberg 2004; Slovic et al. 1991; Spies et al. 1998). The key factors that increase community opposition to a high risk hazardous facility have been identified as distrust of facility management, high risk perception, perceived lack of economic benefits, potential stigma, previous negative siting experience, and perceived inequalities. These factors are frequently interrelated so that opposition is multidimensional and complex. Therefore, community opposition to the siting of high risk hazardous facilities, including biolaboratories, is expected to be influenced by any one or more of these factors.

Distrust

A key factor influencing opposition to the siting of a high risk hazardous facility is distrust in the responsible agencies and organizations managing the sites (Albrecht, Amey and Amir 1996; Couch and Kroll-Smith 1994; Flynn et al. 1992; Jenkins-Smith and Kunreuther 2001; Sjöberg 2004; Wakefield and Elliot 2000). Opposition is magnified when community members do not trust the people or institutions responsible for the proposed facility. As trust in facility management decreases, resident opposition

to these facilities increases (Albrecht et al. 1996; Couch and Kroll-Smith 1994; Flynn et al. 1992; Jenkins-Smith and Kunreuther 2001; Sjöberg 2004; Wakefield and Elliot 2000).

A related explanation for opposition to high risk hazardous facilities is recreancy, a multidimensional factor of both trust and risk perception (Freudenberg 2001). Freudenberg (2001: 87) originally defined recreancy as "the failure of institutional actors to carry out their responsibilities with the degree of rigor necessary to merit the social trust they enjoy." Recreancy has been generally viewed as the extent to which people trust institutions and experts responsible for safely managing high risk hazardous facilities (Murdock et a. 1999).

When people lack the knowledge required to assess the risks and benefits associated with a technology, they have to depend on experts to provide that information. Thus, when individuals lack knowledge of a hazard or technology, trust in those managing the facilities influences risk perception. Social trust in experts has been found to be an important factor influencing risk perception when knowledge is lacking (Siegrist and Cvetknivich 2000). As a result, residents with low levels of recreancy in nuclear waste managements exhibit more opposition to those facilities (Freudenberg 2001). Similarly, residents with lower levels of recreancy have shown higher levels of opposition to high risk hazardous waste facilities (Murdoch et al.1999).

Risk Perception

Opposed community members may question the ability of a facility's management to protect the community from various perceived health and safety hazards associated with the facilities during the construction and operation of these sites. Such opposition to a high risk hazardous facility has been found to be influenced by the

perceptions of technological risk (Flynn et al. 1992). Perceived technological risk is thus associated with the potential negative consequences that may result from the technologies used to operate facilities. When a technology is risky, people anticipate few benefits from its implementation (Siegrist and Cvetkovich 2000). Risk perception studies have found that people perceive hazardous wastes, especially nuclear waste, as unknown, uncontrollable, and dreadful (Slovic 1987). Additionally, another dimension of risk perception is the idea of "tampering with nature", or interfering with natural processes (Sjöberg 2000). As community members' risk perception in a proposed facility increases, the likelihood that they will oppose the facility also increases (Bourke 1994; Flynn et al. 1992; Jenkins-Smith and Kunreuther 2001; Krannich and Albrecht 1995; Spies et al. 1998).

Risk perception is closely associated with potential public health, safety risks, and environmental contamination. Community opposition results when residents fear that the community's health and safety are threatened if a facility's technology fails (Bassett, Jenkins-Smith and Silva 1996). General environmental contamination and specific environmental impacts on wildlife, groundwater, rivers, and other water sources have also been found to be major technological risk concerns of those opposed to siting facilities (Albrecht el al. 1996; Baxter, Eyles and Elliott 1999; Krannich & Albrecht 1995). Additionally, residents may fear that environmental contamination could cause an area to become an unsuitable location for people to live (Bassett el al. 1996). Resistance is magnified when opposed residents perceive high levels of risk associated with both health and safety issues and environmental contamination (Murdoch et al. 1999).

Numerous studies have tried to explain why people perceive risk differently. One explanation is that risk perception is impacted by the knowledge level that each individual has of the technological application at any given high risk hazardous facility; however, there are disagreements as to whether less knowledge actually increases risk perception. Some studies have found that those with greater knowledge of the technology utilized in or proposed for facilities perceive less risk (Bassett el al. 1996), while other studies have noted that those with less knowledge perceive more risk (Flynn et al. 1992). Still studies have found that less knowledge does not equate to more opposition; in fact, those most strongly opposed to a high risk hazardous waste facility have the greatest level of knowledge of waste management issues (Murdock et al. 1999).

Perception of risk appears to be socially constructed differently by experts and laypeople who "speak in different languages" (Gerrard 1994). Experts and laypeople appear to have different "conceptual frameworks" when defining and evaluating risks (Flynn, Slovic, and Mertz 1993). Experts can be defined as those people with professional involvement with risk assessment who perceive risks based on quantitative, technical, and factual information (Fischhoff, Slovic and Lichtenstein 1985). Experts are more positive about high risk hazardous technologies and have fewer concerns (Flynn et al. 1993); additionally, they believe little is unknown about technological risk (Sjöberg 2001). In contrast, laypeople can be considered those people who assess risks that are more likely to be unanswered by science, especially those risks that are unfamiliar, dreaded, unobservable, or have delayed effects (Fischhoff et al. 1985). Laypeople are skeptical about expert knowledge and view unknown risk as very negative (Sjöberg 2001).

While experts evaluate risks based on scientific information, laypersons perceive risks as questions that science has not answered. This discrepancy in identifying risk often fuels community opposition to a high risk hazardous facility. Residents may view experts as not only untrustworthy but also as patronizing and too technical (Baxter et al. 1999). Expert communication at public meetings may negatively impact residents' perceptions of risk (McComas 2003). Residents may also believe there are limits to the experts' knowledge so that guarantees of negligible risks can not be legitimately made by the experts (Baxter et al. 1999). Although most evidence suggests that experts judge risk differently than laypeople, others conclude that little empirical evidence exists to support this claim since risk perception is confounded by other social and demographic factors (Row and Wright 2001).

Lack of Perceived Economic Benefits

A key factor influencing opposition to the siting of high risk hazardous facilities is the perception that the facility will not provide economic benefits to individuals and the community. As many rural communities struggle economically, high risk hazardous facilities offer a source of potential economic growth that could create local employment. Additionally, economic incentives and mitigations offered by the facility's management could increase public funds for infrastructure and services such as roads, schools, water or sewer systems, and police and fire protection. Overall, opponents to a facility have negative views of the benefits offered by facility management (Jenkins-Smith and Kunreuther 2001).

Opposition to a facility is increased if residents perceive that few economic benefits will result from the new facilities (Bourke 1994; Krannich and Albrecht 1995;

Murdock et al. 1999; Spies et al. 1998). Additionally, communities with a stronger local economy perceive fewer economic benefits and have been found to exhibit more opposition than those with weaker local economies (Bourke 1994). Greater levels of opposition have also been documented in towns further away from proposed facilities since residents perceive fewer economic benefits as facility distance increases (Benford et al. 1993).

Stigma

Community stigma may also become associated with siting a high risk hazardous facility and such stigma has been found to impact resident opposition. Stigma can affect the "collective morale" or social well-being of a community (Gregory and Satterfield 2002; Wulfhorst 2000; Wulfhorst and Krannich 1999). Additionally, stigma can cause many psychological and cultural impacts for contaminated community members (Gregory and Satterfield 2002).

Residents may be concerned that hosting a high risk hazardous facility will result in the community being labeled as "contaminated" and that permanent stigmatization will result (Wulfhorst 2000). Because outsiders may perceive the community as contaminated, the community's reputation will be destroyed. Stigma can therefore have negative economic effects on a locale. Opposed residents believe that stigma will have a negative impact on industries located in the community; in particular, concern for a decline in tourism has been noted (Albrecht et al. 1996; Flynn et. al 1992; Slovic et. al 1991).

Additionally, opposed residents may believe that a high risk hazardous facility will threaten the quality of life of their rural community and that the core community

values of a quiet, small-town community will be lost (Baxter et. al 1999; Couch and Kroll-Smith 1994; Fitchen 1991; Krannich and Albrecht 1995; Wakefield and Elliott 2000). In particular, opposed residents may believe that their community will be spoiled by such a facility and that the impacts are not consistent with rural images of an open, clean countryside (Baxter et al. 1999; Fitchen 1991). While stigma is most frequently associated with negative consequences, residents of high growth communities may believe stigma will suppress population growth, which may be a positive outcome for those resistant to population growth (Wulfhorst 2000).

Siting Experience

Opposition is also influenced by whether a community currently hosts a high risk hazardous facility. When a high risk hazardous facility is a new institution in a community, the new host residents' opinions differ from residents in communities already hosting such facilities. Residents are more likely to be opposed to the siting of a new facility if their community is not a current host. Communities with high risk industries are already familiar with the facilities and technology; additionally, local community members may work at the facility. In contrast, in potential host communities such facilities may be a new, unknown threat (Albrecht et. al 1996; Krannich and Albrecht 1995; Sjöberg 2004).

Community opposition is also influenced by the siting process as residents balance the costs and benefits associated with their community hosting a high risk hazardous facility. Residents in baseline, nonwaste facility communities are more likely to be opposed than residents of waste operating and waste siting communities (Murdock et al. 1999). Although opposition may still be high, residents of communities with an

operating or soon to be sited facility become less opposed overall to high risk hazardous facilities when compared to baseline, nonwaste facility communities; additionally, residents perceive lower risk levels created by these facilities (Benford et al. 1993; Murdock et al. 1999).

Equity

Perception of equity in distributing the potential impacts of a high risk hazardous facility is a key factor influencing resident opposition to such facilities. Equity issues often involve questions of intrusion since unwanted wastes and technologies are imported into communities. Public opposition is greater when the hazards are created elsewhere and imported into a community (Gerrard 1994).

While society has created the need for these facilities, rural residents are required to take more hazardous waste than urban residents as communities that host high risk hazardous waste facilities are predominantly rural (Murdock et al. 1999). Rural residents become sensitive to the costs and benefits that their community will face by hosting these sites. Frequently, site managers offer economic incentives and safety measures to the community to mitigate the costs and risks associated with hosting high risk hazardous facilities. If the economic benefits and safety measures offered by facility management are perceived as unfair, opposition is increased (Jenkins-Smith and Kunreuther 2001). Opposed community members may feel that the process offers little opportunity for meaningful participation (Wakefield and Elliott 2000). Additionally, if the siting process is perceived as unfair, opposition is often magnified (Murdoch et al. 1999; Spies et al. 1998).

The environmental justice movement has focused attention on the fact that ethnic, people of color, and poor communities are disproportionately exposed to environmental risks (Bullard 1993). As the number of colored people increases in a community, the probability of high risk hazardous facilities being located there increases (Lee 1993). Socio-economic status also impacts the location of hazardous wastes, as poor communities are more likely to be targeted as hosts (Lee 1993). Residents in communities with lower socioeconomic status are more likely to oppose a high risk hazardous facility, despite the potential economic opportunity (Buhon and Humphrey 2000). However, race is still the most significant predictor of where hazardous waste facilities are located (Lee 1993). Frequently a combination of equity factors influences community opposition; for example, opposed residents may feel that their community is being targeted because it is a poor, rural, ethnic community (Albrecht et. al 1996).

Summary

The complex and interrelated key factors influencing opposition to high risk hazardous facilities in rural communities have been widely examined. Opposition to the siting of other high risk hazardous facilities, including biolaboratories, should be expected to be influenced by similar factors. However, community response to biolaboratories has not yet been investigated. Therefore, the previous studies examining community opposition to high risk hazardous facilities will inform this study. This exploratory study will examine if opposition to a biolaboratory reflects those of other high risk hazardous facilities.

CHAPTER FOUR- METHODOLOGY

The purpose of this study is to explore the degree to which a biolaboratory is perceived to be a high risk hazardous facility. Additionally, this study will explore community opposition to the IRF expansion at RML in Hamilton, Montana. This study will seek to describe the perspectives of those opposed to the project during the period of proposed expansion from January 2002 through June 2004. Therefore, in the context of what is known about community opposition to high risk hazardous facilities, this study will seek to answer the following question: What are the factors that characterize community opposition to the IRF expansion at RML?

Research studies on rural, community grassroots opposition to biolaboratories is an unexplored topic. Since this topic has not been studied, I will use qualitative methodology for this exploratory study. Historical analysis and in-depth interviews were the two types of qualitative methodology used in this study. Qualitative methodology is useful when seeking to "uncover and understand what lies behind any phenomenon about which little is yet known" (Strauss and Corbin 1990:19).

Historical Research

A detailed historiography of RML was created through historical research methods. Historical research is "a process that examines events or combination of events in order to uncover accounts of what happened in the past" (Berg 2004:234). Understanding the history of events, people, and institutions is an important element of understanding recent or present situations (Berg 2004).

The historiography of RML was compiled by collecting primary and secondary data. Primary data were collected from personal communication with one current, and two previous, RML scientists. I met with each current or previous RML scientist at his/her home, office, or RML. I met with each person once, and our conversations lasted approximately one to two hours. During these personal communications, I asked each scientist to describe the laboratory's history including changes in organizational structure, safety features, and research agenda. These conversations were not audio tape recorded, but I took detailed notes. Within one day after the conversations, I typed my notes from the conversations so key information would not be forgotten. I also collected secondary data from newspaper articles, magazine articles, books, U.S. Census Bureau documents, and RML documents.

In-Depth Interviews

Sampling

The target population of this study is defined as those residents of Hamilton, Montana and the surrounding area who were opposed to the IRF expansion during the study period. Residents opposed to the biolaboratory expansion include individuals who served as staff or active members of opposition groups, maintained a leadership role in the opposition movement, or participated in voicing concerns, writing letters, or some other form of active criticism of the expansion.

Purposive and snowball sampling were used to select participants for in-depth interviews. Purposive sampling was used first to identify three participants who were key leaders of opposition groups on the basis of newspaper coverage. After using purposive sampling to identify the first three opponents, snowball sampling was used to identify

other potential participants for the in-depth interviews. Snowball sampling was used to "locate subjects with certain attributes or characteristics" (Berg 2004:36). In this study, I used snowball sampling to identify opposed citizens to the IRF expansion at RML. This was accomplished by asking participants at the close of each interview to suggest other community activists who may have also been opposed to the expansion.

Interviews were conducted until saturation, or the lack of new information produced in the interviews, was achieved. Additionally, as I requested names of prospective interviewees from participants, their suggestions began to overlap. Overall, I found a general willingness by those opposed to the IRF expansion to participate in this study. Twelve potential participants were contacted for this study; however, one person did not respond and another individual agreed to participate but did not return telephone calls to arrange an interview. Thus, a total of 10 interviews were conducted in August, September, and November 2005.

In the sample, six individuals were male and four were female. Five of the participants lived in Hamilton, Montana, and five lived outside of the Hamilton city limits. A total of seven interview participants were members of opposition groups; three individuals did not identify themselves as part of any particular group.

The Interview Process

Interviews were conducted to gain an in-depth description of opposed residents' perspectives. I contacted prospective participants on the telephone. After providing a short description of the project, I asked potential participants if they considered themselves to be opposed to the expansion. If residents identified themselves as opposed to the expansion and agreed to participate in the study, a meeting location and time were

arranged. All interviews were conducted face-to-face at either the Hamilton Public Library or the participants' place of employment or residence. I guaranteed the participants confidentiality and the interviews were audio tape-recorded.

The in-depth interviews were semi-structured, which provided flexibility in the ordering and wording of questions (Berg 2004). Additionally, I found this strategy provided flexibility so that probing questions could be asked to clarify participants' responses and to elicit more information (Berg 2004). An interview guide (see Appendix C) was created to provide a general outline for the purposive conversations, although because of my semi-structured approach, it was not strictly followed. During the interviews, I asked questions about the participant's concerns with the IRF expansion and how he/she expressed those concerns. I also asked participants to describe their opinion of the IRF expansion, previous opinion of RML, and how they thought that the approval process had affected their community. The interviews ranged from approximately 30 minutes to 90 minutes in length.

Data Analysis

Data management was the first step in the data analysis process. Before transcription, a pseudonym was given to each participant. I transcribed each audio tape recorded interview verbatim within one week following each interview into Microsoft Word. After transcription, I imported the transcription text into the qualitative software program NVIVO which I found to be a helpful data management tool. I used the NVIVO program to organize, store, and search the data obtained from each in-depth interviews.

The second step of the data analysis process was accomplished by using content analysis. This interpretative approach views written documents, such as interview

transcripts, as "text" that can be condensed, categorized, and compared (Berg 2004). I began content analysis by open coding to "open inquiry widely" (Berg 2004:278). Open coding is the "naming and categorizing of phenomena through close examination of data" (Strauss and Corbin 1990:62). During this process, I examined five interviews line by line and asked: what does this text represent? What is the major idea of this line of data? For example, one participant said "People are so ignorant though, they just don't want to believe that the government would do something that way or be anything but forthcoming." During open coding, I labeled this sentence in NVIVO as *skeptical of the government.* Although NVIVO does not analyze data, I used it to create and apply themes to the data. After themes were created and labeled to corresponding data, I used NVIVO to search and explore the coded data. For example, I could use NVIVO to locate each sentence labeled as *skeptical of the government.*

In open coding, I used an inductive approach, which is the process of immersing oneself in the data "in order to identify the dimensions or themes" (Berg 2004:272). By using this approach, I was able to create my own themes to describe the data. In using the open coding strategy to analyze five interview transcripts, I created approximately 25 codes. After analyzing five interviews, the open codes began to overlap. For example, I had created the theme *skeptical of the government* and *fear government was hiding information.* As a result of the open coding strategy, themes were not well defined and it became difficult to label the data.

The second step of content analysis was axial coding, which is defined as "a set of procedures whereby data are put back together in new ways after open coding, by making connections between categories" (Stauss and Corbin 1990:96). During axial coding, I

incorporated the deductive approach, whereby categories suggested by the literature review were integrated into the content analysis process. This strategy of balancing inductive and deductive approaches allowed the creation of categories from the data guided by insights from previous studies.

Thus, I examined the codes produced during open coding and compared those to themes suggested by the literature review. For example, the previously mentioned code *skeptical of the government* was comparable to the theme from the research literature of *distrust.* Furthermore, during axial coding I noted various dimensions of *distrust* were prevalent in the data, including *distrust of the federal government* and *distrust of laboratory scientists.* I found these dimensions by asking: How are these data similar and/or different? Therefore, I was able to define each theme and subsequently code the data with these themes. I thus analyzed each of the 10 interview transcripts and labeled the data with themes created during axial coding.

Results of the coding analysis process were then compiled based on the prevalence of the themes that I identified in the interview data. I used NVIVO to search the coded interviews to compile a list of data for each theme. For example, I could search for *distrust* and NVIVO compiled all the data labeled with this theme. I then found the prevalence of each theme by counting the number of participants who mentioned them. For example, I counted how many out of the 10 interviews included data labeled with the theme *distrust.* Themes were then prioritized from most to least prevalent. The results from the content analysis of the interview data, including themes organized from most to least prevalent, are presented in the following chapter.

CHAPTER FIVE- RESULTS

Several themes characterized participants' opposition to the IRF expansion at RML (see Table 4). The prevalence with which participants mentioned any particular theme varied. Nevertheless, themes could be organized from most to least frequently prevalent in terms of how many participants mentioned a given theme during the in-depth interviews. Prevalence was determined by the number of participants who mentioned any particular theme during each in-depth interview. This chapter summarizes those themes that emerged in terms of the prevalence with which participants expressed them.

Table 4: Prevalence of the themes found to characterize participants' opposition

Theme	Number of participants who mentioned theme
Negative perception of the IRF expansion approval process	10
Distrust in institutional authority	9
Negative perception of potential IRF risks	8
Distrust in the justification for bioterrorism research	7
Negative perception of the equity of IRF expansion	7
Perceived lack of economic benefits from IRF expansion	3

Negative Perception of the IRF Expansion Approval Process

The most prevalent theme found to strongly characterize participants' descriptions of opposition was a negative perception of the public process involved in approving the IRF expansion. Participants reported being disappointed, discouraged, and outraged by the IRF approval process. One opponent described the approval process as "heinous"; another as a "slap in the face"; and a third as "really crappy". Every participant interviewed expressed concern about the IRF approval process. Thus, a negative

perception of the approval process appeared to most strongly characterize each of the 10 participants' opposition to the IRF expansion at RML.

Four dimensions of perception of the IRF approval process characterized participants' description of opposition. These dimensions included a perception of a predetermined outcome, concern with unaddressed safety issues, an experience with unanswered questions, and a sense of feeling powerless.

Perception of a Predetermined Outcome

One dimension of the negative perception of the approval process that influenced participants' opposition was their perception that the IRF approval process outcome was predetermined. All of the participants claimed that the outcome of the IRF approval process had already been decided. Participants expressed discouragement in describing how they felt that the NIH was determined to locate the BSL IV laboratory at RML and that the federal government was just "going through the process". They claimed that the NIH thought that it could "slip the BSL IV laboratory through" without anyone noticing. Mr. Adams[5] describes how the decision was "pre-ordained":

> I went through the process of the local stuff and it was obvious from the meetings and talking to people here that it [IRF approval process] was pre-ordained. The government and the lab had already made the decision they were going to build it [BSL IV laboratory] here no matter what the locals said, no matter what the state said. It is obvious from the meetings and from these people that it is going to go through no matter what.

[5] All participants were previously assigned pseudonyms to insure their anonymity, so quotations around long, direct quotes are not included. Additionally, their organizational affiliation and other key characteristics that could identify the participants have been dropped or modified to insure their confidentiality.

Similarly, Ms. Peterson claimed that the outcome had been predetermined:

> There was a ton of examples that we pulled together. Just the way they [RML and NIH][6] were talking about it was like this is what we are going to do. They came and presented it [IRF expansion] that early meeting as we are building this here. It wasn't we are proposing, but we are building this here.

Thus, participants described how they believed that the outcome of the public process to approve the IRF expansion as predetermined and expressed how it had impacted their opposition. As Ms. Peterson noted, "That [the public process] was something that made a lot of people angry. How valid is the process if you already made this decision?"

Concern with Unaddressed Safety Issues

Another dimension that opponents' expressed in their dissatisfaction with the IRF approval process was that the safety issues that they were concerned about had not been addressed. Every participant noted at least one, if not many, safety issues with the BSL IV laboratory. Mr. Green questioned, "The main concern for me was safety. . . Were they [RML] going to be safe"?

Participants expressed concerns about a wide variety of safety issues. For example, five participants questioned whether the security at RML was adequate, especially in preventing a terrorist intrusion to obtain biological agents or in avoiding a possible terrorist attack on RML. Mr. Potter noted, "This has got to be one of the softest targets anywhere", and noted the laboratory's vulnerability to "either whackos or terrorists". Ms. Moore also was concerned with a perceived lack of RML security:

> The terrorist thing [September 11, 2001] recently happened and there is just like this little chain linked fence around there [RML]. It is just--there is no safety.

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[6] During the interviews, participants often used the term "they" when referring to those overseeing the IRF expansion. It is unclear whether participants were referring to RML, NIH, or both. Thus, because of this ambiguity, I have noted both RML and NIH.

> And then I said how hard would it be to go blow that place up? Or like do anything to it. You could totally breach that system. It's not—I mean I could—and I'm Joe public and I don't know anything about any of that but it would not be hard. No, they [RML and NIH] didn't talk about it.

Five participants expressed concern that the laboratory's emergency plan in the event of an accident or release of a BSL IV agent would fail. Ms. Peterson explained:

> What we wanted was basically proof that or a good argument from the lab they could handle emergencies associated with the BL four. This was part of the public process and part of the EIS, but it was like okay we can't really decide if we are for or against this thing. We just want to know if you are prepared for it. If it turns out you are inadequately prepared for it, then we are probably against it. If you can prove that, yes, we have thought about all these contingencies. We have the infrastructure in place. We have a really good emergency plan that can handle it. Then we can come out in favor of it. We still don't have that information.

Four participants also expressed concern that the community might lack adequate infrastructure to handle an accident or release of a BSL IV agent. Mr. Potter noted:

> Accidents do happen even in the best of situations, so I think a facility like that [BSL IV laboratory] for that reason should not be built in a residential area. The infrastructure in Hamilton is insufficient to handle some big outbreak.

Three participants, including Mr. Potter, expressed concern about the transport of infected people to other locations in the event of an accident:

> Instead of spending what it would have cost to bring the Marcus Daly hospital up to specs to deal with a patient that might be infected with stuff coming out of that lab, instead of doing it here in Hamilton where presumably the potentially bigger danger lies, the plan is to ship them clear to Missoula. Because Missoula already had a facility that was going to be cheaper to upgrade—well, hell with that money we are talking people's lives. And Highway 93 is famous for accidents. So here you are going to have a person that maybe has Ebola in back of a regular ambulance clear up to Missoula. Well, there is a possibility to have Ebola spread down the highway.

Similarly, two participants also expressed concern about the safety of transporting pathogens to the laboratory. Mr. Hill explained:

> Even the transport of pathogens coming into this BL four. A lot of the people that were citizen liaison members for the lab--picked by the lab--at the meetings had no idea that these pathogens were transported through FedEx. The same trucks that deliver your packages are delivering those. . .You know we have NIH security at the lab that we never had before. It would be really nice to think that they are the ones responsible for transport from airport to lab direct, instead of it being handled throughout the whole valley in a FedEx truck.

Although expressions about safety issues varied widely, participants appeared dissatisfied in how their safety concerns were being addressed by the public process established to approve the IRF expansion. Each participant complained about the inadequacies of the Environmental Assessment (EA) and the multiple drafts of the Environmental Impact Statement (EIS). Participants claimed that these procured documents did not properly address the safety issues associated with the BSL IV laboratory. Mr. Davis, as well as other participants, complained about the EIS that the NIH had released:

> In their environmental impact statements, they [RML and NIH] would look at what are the safety impacts? What are the environmental impacts of this lab? And essentially they were saying there are none. We provided them with 70 pages of impacts for them to look over and consider. When we get [other federal government] EIS on large proposals, they usually run about 700 to 1000 pages. What we got was about a 40 or 50 page little document that essentially said there aren't any impacts.

Mr. Davis noted that the EIS was "about a 40 or 50 page" document, and three other participants also commented specifically about how they perceived the size of the report to be exceptionally small. For example, Ms. Jackson complained that the environmental assessment was "inadequate" and only "one eighth or quarter of an inch":

> They [RML and NIH] didn't do an adequate environmental assessment to begin with. They did a very shoddy job. We asked them to do another one, and then an environmental impact statement and then I think they did—I even lost track—the EA, the EIS, and all that but there were several, several times we asked them—this is just not adequate. When we got the first one it was maybe one eighth or quarter of an inch big. For something like the highway [93] project, they had

> mounds and mounds of paperwork on that for environmental impact statement. So you would think something this big, and this is the government, this is National Institute of Health, NIAID that they would think ahead and do something adequate to begin with. But they just didn't. They just didn't.

Five participants also expressed disappointment in how their concerns about safety issues were overlooked by the RML Community Liaison Group (CLG). They also expressed disapproval in how RML had formed the CLG (see page 24 for the earlier discussion of the formation of the CLG). As Mr. Potter noted, "the people at Rocky Mountain Lab had selected them [CLG] because of their support of the lab." Participants claimed that they did not think their concerns could be addressed by the CLG because it was dominated by "cheerleaders" for the IRF expansion. In the words of one participant, Mr. Green:

> The citizen's advisory group is appointed. So much for representation since it is appointed. They invited, I think they invited [opposition group] on it because they were the quote [type of environmental group]. First thing we said is it doesn't represent--where is [opposition group], why aren't they at the table? Why aren't they at the table? It wasn't democratic. It was a stacked deck.

Five participants also expressed discouragement with how the CLG meetings functioned. They claimed that participants felt the meetings offered few opportunities for public participation. For example, Mr. Hill described the CLG:

> It [community liaison meeting] was run from the lab. It was done in the lab and so as a spectator if you wanted to get in you would have to call prior. You would be able to sit behind [community liaison members] but you could not ask any questions or participate in any way. Only the citizens of the liaison could bring in questions from the community.

In sum, participants explained how the CLG meetings, which had been designed to increase communication between RML and the community, did not address their safety concerns. Ms. Brooks commented that the CLG meetings "were a joke. Anybody who was on that would tell you it was a joke."

Experiences with Unanswered Questions

Frequently, participants noted how their safety concerns were unaddressed by the IRF approval process because of unanswered questions. Six participants expressed discouragement in how many of their questions were unanswered by the approval process. For example, Ms. Moore said she had questioned what would happen in the event of an emergency, and she noted that "they [RML and NIH] didn't have an answer. They had no idea."

Participants described how their questions frequently went unanswered, and they described how the lack of information angered them. Mr. Smith noted that the lack of information "set people off":

> I knew that at the first meeting getting any information out of them [RML and NIH], it was obvious that they weren't giving any information. That was really what set people off. Right at the beginning.

Later in the interview, Mr. Smith continued:

> Then they [RML] held a meeting, that is, a public meeting was organized by the Rocky Mountain Lab and people attended and most of them had only known about it for three or four days at the time. . . we were bothered by the fact that they didn't know anything. We were bothered even more after the meeting because we were asking questions and we were told we are not here to answer questions, we are here to take comments. That was the formula that they were using. They had no information to give out about it [IRF expansion] except for some pictures that they had some renderings. Nothing much about the impacts. Nothing much about how in would affect the community or anything else.

Participants explained how in the course of the IRF approval process safety issues and questions remained unanswered. Thus, as their concerns were trivialized, their anger increased. For example, Ms. Brooks noted:

> Actually my really main concern was the process. I felt, and I spoke at a couple of meetings, I felt it was a done deal. That they [RML and NIH] really--the whole process that they went through was really for show. I don't feel like it ever had--they were just going through the motions. To add insult to injury, at the end

> of two or three meetings they would serve us cookies. . . [Lab personnel] would say, 'Well we need to stop now so we can have coffee and cookies.' And it was like give me a break. I really felt that they were very condescending. That they really were just going through the motions. I have to say as the process went on I probably got a little angrier. Especially when they kept feeding us cookies.

Sense of Feeling Powerlessness

Seven participants described a sense of feeling powerless as the IRF approval process unfolded. Four participants specifically referred to the IRF approval process as a "game", and two participants noted that the process was like "banging your head against the wall".

Participants described feeling powerless because they said that the approval process was predetermined, ignored their safety concerns, and left their questions unaddressed. They claimed that the opinions of local residents, including themselves, were ignored. Mr. Hill said, "They were ramming this down our throat. They were giving us no options in the matter; it wasn't brought to the people to begin with." Similarly, Ms. Moore noted:

> No, I mean it was hideous. They [RML and NIH] didn't listen. They didn't care what any of the locals said. I mean they tried to sidestep so much of the issue and wouldn't answer questions. It just wasn't a two-way dialogue at all. It really never was. . . And yet they are not willing to meet us at the table as a community member. I live [in Hamilton], this is my concern-- what can we do? They wouldn't even talk about it. It is crazy. It was really discouraging, like beating your head against a wall. . . They were like it doesn't matter what you people think. We are doing this. We are the U.S. government.

Ms. Jackson described how her sense of powerlessness contributed to her opposition and involvement:

> I became, for a lack of better words, obsessed. Because I was just seeing so much deceit and I felt there was so much injustice. And I knew that people here felt like they didn't have a voice. . . I think I was feeling a little powerless, and that is why I started to get involved. As we were going to more meetings at the lab, we felt like they were playing a game. I felt like they were playing a game.

Distrust in Institutional Authority

In addition to a negative perception of the IRF expansion approval process at RML, participants' opposition to the IRF expansion was characterized by strong distrust in institutional authority. Three dimensions of distrust in institutional authority characterized participants' expression of opposition to the IRF expansion. One dimension was distrust in the "experts", or laboratory scientists at RML. The second dimension was distrust in the federal government in managing RML. Finally, participants expressed distrust in information about RML as sources of reliable information were often rumors and stories.

Distrust of Laboratory Scientists

Participants expressed skepticism of the "expert" scientists at RML. Nine of the 10 participants expressed distrust in the scientists at RML and said that their distrust had contributed to their opposition to the IRF expansion. One participant, Ms. Moore, described her perception of RML scientists when she said, "We are these wonderful scientists. How could we go wrong? Shame on you for not trusting us. I was just like whoa."

Some participants claimed that experts from RML and NIH used their position and scientific knowledge to persuade residents to support the IRF expansion. One participant, Ms. Brooks, called the experts "big-wigs" and said they "could talk circles around the average Bitterrooter." Part of the distrust in laboratory scientists arose as participants claimed that the IRF approval process had become controlled by experts. Mr. Smith explained:

> It [IRF approval process] became run by a professional back in Bethesda. They used every little nuance like everybody's a doctor; doctor this, doctor that makes

> these pronouncements. They are supposed to be scientific and everything I knew very well that they weren't.

Participants expressed distrust in laboratory scientists in noting that they are "just human" and "humans make mistakes all the time." Mr. Potter noted that the scientists were "very fallible." Most participants said that they questioned the experts' knowledge and noted that human mistakes were inevitable in the laboratory, even by expert scientists. The inevitability of mistakes at RML was described by Mr. Potter:

> I know that people make blunders everyday at their jobs and there is not a fool-proof system. If people are lackadaisical there will be mistakes made. It is just inevitable.

In contrast to most participants accepting the inevitability of human error at RML, some reported that the laboratory scientists had made contradicting declarations. These participants described how the experts claimed that mistakes at RML would not happen. According to them, the experts claimed mistakes in the "super high-tech" laboratory were impossible. Ms. Peterson explained:

> There wasn't terribly good documentation, and they [RML and NIH] didn't provide very much, of any one ever making a mistake at the lab before. And of course no one has ever made a mistake at a level four and they had all these inaccurate assumptions.

The expert role was challenged as mistakes that occurred at RML were revealed. Participants noted how during the IRF approval process, several historical mistakes that had occurred at RML, or errors for which RML was responsible, had become public. For example, participants described the deaths of research monkeys from a thermostat malfunction, an unidentified object found on RML property, and RML waste disposal buried at a nearby landfill. Often, participants described these events in the context of the

probability of future mistakes happening at RML. For example, Ms. Jackson described how opponents had discovered such events and revealed the "truth" to the public:

> I was trying to get a lot of the truth out, and there were a lot of things we discovered that were made public. RML was a superfund site. When they dug up to start building for the level three, they discovered buried ash pits with old debris in it. They found a pile or a hole with old vaccine vials buried from years ago. We also discovered that RML along with Corixa lab had contributed to the Victor landfill, which was also a superfund. They were dumping their chemicals there. . . So these things just started coming to the surface during our research.

Participants also expressed disapproval in how RML had handled such events. Mr. Hill described in detail one event at the laboratory and how he distrusted the way the problem had been handled:

> There have been a lot of mistakes over at the lab people weren't really privy to. One of the things that had happened--basically in the newspapers and the way it was reported--was they [RML] found an item that was out by the fence line. An unidentified item and they had handled according to protocol and that the bomb squad in Missoula was contacted. . . And in the newspaper it came out that is was handled through protocol, basically that they [RML] did a good job. . . And not only was it taken into the security shack, mishandled, shouldn't have been touched in the first place. . . But that is how the thing kind of came about, but yet in the papers you read how they do everything by protocol and it's done real nice and everything else.

Several participants expressed concern about both the potential frequency of high risk incidents and the subsequent potentially poor incident response at the BSL IV laboratory. They expressed distrust in the ability of RML to prevent and respond to future accidents or errors once it became a BSL IV laboratory. Ms. Jackson noted:

> There were people that got sick that worked at the lab, tuberculosis for instance. These people were part of the community. They were out there in the community. So the potential for--if they are that careless with something as non-lethal as tuberculosis--how careful or cautious would they be with things that are more deadly?

Distrust in the Federal Government

Distrust in the federal government, which manages RML, was a theme often expressed by participants in describing their opposition to the IRF expansion. Seven of the 10 participants expressed distrust in the federal government and its ability to manage RML. Frequently, when participants spoke of the federal government, they noted that a person would have to be "naïve" or "crazy" to trust the government. This distrust was contextualized in their description of how the federal government is not honest and "does bad things". For example, Ms. Moore explained how she did not understand why people would trust the government:

> So, we just couldn't believe it that they [federal government] were going to try to do that [build a BSL IV laboratory]. But then at the same time we were already aware of what the U.S. government is up to, so it really didn't surprise us once we started thinking about it . . . People are so ignorant though, they just don't want to believe that the government would do something that way or be anything but forthcoming and on the up and up. Which is crazy that people still think that.

Participants described how their distrust in the federal government increased as the approval process had progressed. Some noted a growing belief that the government was ignoring laws and hiding information during the expansion approval process. For example, Mr. Davis described how his organization had sued the NIH because it would not provide internal documents that they were requesting under the Freedom of Information Act (FOIA). As a result, he felt the government was "hiding" things:

> They [NIH] didn't actually admit that they were wrong, but they furnished the documents and gave us all of our attorney's fees. Which to me, and our organization was a victory and it validated what we were saying and that they were trying to hide things.

Two participants also expressed distrust in the federal government in describing how irregularities in the RML water and sewer bill were discovered during the IRF

approval process. One participant, Mr. Smith, described in detail how he discovered the billing irregularities, in which by his calculations, RML owed the city of Hamilton approximately $1 million. Another participant, Mr. Adams, also noted the water and sewer billing discrepancies and said:

> Let me tell you something about the lab. This will tell you something about our government. In all the years the lab has been there, they haven't paid their sewer and water bill completely. There is like hundreds of thousands of dollars that they want us to write off. This is our government. If our government won't pay their water bill, how can we trust them to do anything right? Do you trust anybody that won't pay their bills? No.

Distrust in Rumors and Stories

Another dimension of distrust expressed by participants was the lack of reliable information about RML as a result of the number of rumors and stories about the laboratory circulating within Hamilton and surrounding communities. Six of the 10 participants mentioned that people in the community had circulated rumors and stories about RML. Ms. Jackson commented, "There were rumors you would hear around town, back in the 40s, so and so got sick with such and such. But you know you hear rumors." Although participants did not suggest that they believed these rumors and stories, they expressed distrust in the information about RML that was disseminated through such narratives.

All of the rumors and stories participants shared where about how the laboratory had caused sickness within the community. They recounted that some stories about laboratory workers becoming sick and other stories about community members, not associated with the laboratory, becoming sick. For example, Mr. Green noted:

> There are stories for the people that lived here long time ago. The old people that grew up here will claim that kids, who played outside the school next to the lab--go to a cancer study and you will find that there is a real correlation.

Several other participants noted that such rumors were inevitably going to circulate in the community about RML. They claimed that this was a result of the laboratory "hiding things" as a result of RML's overall lack of honesty with the public. Ms. Moore noted "you know you hear things and things have happened in there [RML] that they don't---they come up, they don't tell you about, they don't tell anybody about. Things like that."

Negative Perception of Potential IRF Risks

A third theme that characterized participants' descriptions of their opposition was their negative perception of risks that the BSL IV laboratory posed to public health and safety. Participants claimed that the IRF expansion, specifically the BSL IV laboratory, would entail a high degree of risk. Ms. Jackson noted, "Originally, there is the knee jerk thing where you hear Biolevel IV lab—oh, my gosh what is a Biolevel IV lab?" Two dimensions of negative risk perception were expressed by participants as characterizing their opposition. These included their fear of the unknown and their dread in potential events.

Fear of the Unknown

Seven participants expressed concern about the numerous "unknowns" associated with the BSL IV laboratory. They described the "unknowns" of the BSL IV laboratory in terms of ambiguity of what could happen if a biological agent was released into the community. For example, when Ms. Brooks spoke about the event of an accidental biological agent release, she said, "Well, we don't know what is going to happen. We really don't know."

Participants who described the "unknowns" of the BSL IV laboratory posed the questions as to what if a biological agent got loose? What would happen? How would RML and the community respond? What would you do? They described their negative risk perception as elevated because of these "unknowns". For example, Ms. Jackson said:

> So I started researching on the internet and realized the things that they [RML and NIH] could possibly bring in. For instance, Ebola. For instance, anthrax. For instance, possibly small pox, even though they said they couldn't do that by law. So I was worried about things that they were going to bring in and what if something got loose? What if the community were exposed to these things? What if a lab worker had been exposed and contracted some disease? What if during the expansion, the building of the project, something happened and something was released into the river? Because they are right next to the river, they are in the flood plain. What if some animals were injured in the building of the project?

Participants said that as they grappled with these "unknowns", their negative risk perceptions about the IRF expansion increased. Additionally, participants described how their negative risk perceptions increased since they felt RML provided few answers to their questions about the "unknowns". Ms. Moore noted:

> It is just ridiculous. I mean we have no isolation rooms at Marcus Daly. We can't treat somebody with tuberculosis because the whole hospital would get infected. So I mean, what would we do? What would you do...so I asked this question to one of the people there: what would you do if somebody had a heart attack in one of the rooms [at RML]? I mean, what would you do? They wouldn't answer it. I don't know, you don't know. Would you call life flight? Would you want our EMS to transport them? What would you do? They didn't have an answer, they had no idea.

Dread in Potential Accidents

Participants often expressed dread in describing the perceived risks of a BSL IV laboratory. Seven of the 10 participants described how they dreaded the BSL IV laboratory, particularly the accidental release of biological agents into the community.

Participants noted "massive deaths" and "devastation" could happen in the community if pathogens were released from RML. One participant, Mr. Adams, said "If they get out, it is a catastrophic thing." Mr. Green also noted, "There were basically just fear of germs escaping and a massive disaster of people dying."

Five participants expressed concern that a major accident would eventually occur. Participants described their dread of an accidental release of an agent from RML. Additionally, participants thought an accidental release of an agent was inevitable. For example, Mr. Hill commented:

> But it [agent release from RML] is going to happen. We know it is going to happen. So it is just a matter of when. And how far it goes. Is in contained or not?

Ms. Moore also commented that an accidental release from the BSL IV was inevitable:

> I think once something [agent release from RML] does happen, which I think it is just a matter of time, five years or 35 years, or 50 years. I don't know. But definitely, how could it not?

Participants also speculated about what could happen in the event of an accidental agent release from RML. Three participants, including Mr. Adams, spoke openly about the potential outcome of potential accidents:

> If it [agent release for RML] is in this little valley and an accident happens, word gets out. They [federal government] can sterilize this valley very quickly. They can use fuel air mixture devices and sterilize this valley and everything in it very quickly. People say our government wouldn't do that. Well, if you were the president and they [government officials] came to you and said 'it's loose in that valley'. We can kill 30,000 or we can allow two billion to die, what would you do? Would you sterilize the valley? You would have to.

Distrust in the Justification for Bioterrorism Research

A forth theme that characterized participants' descriptions of their opposition was distrust in the justification for bioterrorism research. Seven of the 10 participants

described how their opposition had been characterized by skepticism of bioterrorism research. These participants explained how they questioned the motivation behind bioterrorism research conducted in a BSL IV laboratory. Additionally, they also explained how they questioned the need for bioterrorism research in general.

Questioning the Motivation for Bioterrorism Research

One dimension of distrust in the justification for bioterrorism research was the questioning of the motivation for bioterrorism research. These seven participants described how they thought the "fear of terrorism", rather than an actual threat of terrorism, was the driving purpose of the IRF expansion. Ms. Jackson explained:

> The people that were involved in our [opposition] groups--were people who were--may have seen or considered or thought that this [BSL IV construction] was a knee jerk reaction and more money was being poured into it by the government to supposedly protect us from terrorists. I think a lot of people, well in my circle, thought that it was kind of a knee jerk reaction and that it wasn't really necessary. It wasn't going to really affect us directly as far as terrorism goes.

In addition, Mr. Green described how the IRF expansion had been based on fear:

> It is actually a project that had been thought about before 9/11, but it rode in on the back of 9/11 in some sense in terms of the rhetoric. It rode on the back of patriotism, and the fear part of 9/11.

Mr. Hill also described how he thought fear of bioterrorism was a driving force of the project, but he also noted that "fear of the lab wasn't an issue" because:

> It was always a fear of well now the terrorist type of activities, 9/11 and type of stuff that we [federal government] need to start doing this research for our own safety. . . So their [RML and NIH] own side, and this is what I was having difficulty of getting around through to them, they were using fear to push through a BL IV. . . So they used fear to get it, but yet when it came down to fear as far as the lab itself--safety or anything else--then that wasn't an issue.

Questioning the Need for Bioterrorism Research

As participants described how they questioned the motivation for bioterrorism research, they also explained how they questioned the actual need for bioterrorism research. However, participants' beliefs that bioterrorism research was needed varied. Three participants specifically expressed that bioterrorism research should not be done, while two participants supported bioterrorism research. Five participants did not express either positive or negative opinions about bioterrorism research.

Those participants that expressed bioterrorism research should not be done said they were skeptical of what the federal government would do with the results. Primarily, they were opposed to bioterrorism research because they feared it could be used to create biological weapons. Mr. Davis described how he was concerned about bioterrorism research:

> I believe in good science and good research. I think RML does a lot of good stuff over there. I can't say I am opposed to good research, of course the problem is when you start doing research on agents that have either been weaponized or that are potential biological weapons. Once you start setting those organisms in that framework, you become part of the problem. One thing is for certain in science that information will ultimately go out and be used by somebody to hurt somebody. I think that was what happened in the anthrax attacks. The strain of anthrax that was used was the AIMS strain which was developed by the U.S. military. The one bioterrorism attack that we had in our country came from within our own country, an organism that had been engineered by our government for biological warfare. I think that really says a lot about how we need to be cautious in terms of the kinds of research that we do and for what reasons.

Similarly, Ms. Moore described her disapproval of bioterrorism research:

> What they [RML and NIH] didn't really say until part way through this [IRF expansion approval process], was this is part of the homeland security deal funding. It is not public health. It is not the public health of the United States they are looking at, it is a defense contract. We are—they [RML scientists] are going to be building bombs there. Or at least the technology to make them somewhere else. And why wouldn't they? It is just way too scary. What the

> ethics of that? I mean, come on. We [federal government] are planning on killing people with these horrible, wretched, torturous diseases. It is awful.

However, two participants claimed that they supported bioterrorism research. When I asked if Mr. Potter if he thought the federal government should conduct bioterrorism research, he commented:

> I 100% agree. That is why I say build it [BSL IV laboratory] in a secure location. Go down to Nevada's test site. We [federal government] already have all the borders. We got the buffer zones. We got the security. There is a jillion acres out there. Build it there. That would make sense. But we need them [BSL IV laboratories].

Although perceptions for the need for bioterrorism research varied, most participants claimed that their community was not an appropriate location for a BSL IV laboratory. In fact, many participants noted that research should be conducted elsewhere, such as in the desert or at a military facility. For example, Ms. Brooks noted the laboratory should be located in a "protected area":

> I think Hamilton is the last place that a Biolevel four lab should be. I believe that it needs to be in a protected area. I think it is highly inappropriate here.

Negative Perception of the Equity of IRF Expansion

In addition to distrust in the justification for bioterrorism research, a negative perception of the equity of the IRF expansion at RML was also a prevalent theme characterizing participants' opposition to the IRF expansion. However, a negative perception of equity was a unidimensional theme. Seven participants claimed that Hamilton, Montana was intentionally selected for the BSL IV because it was a rural locale. Reasons that participants suggested for why rural Montana was selected included the "rural mindset" and a sparse population.

Participants described how it was unfair that their community was selected to host the BSL IV laboratory simply because it was a rural area. Mr. Hill noted, "I think that they [federal government] looked at this small community and said that this community will be a pushover." Participants' often described how they perceived that their community had been unfairly selected to host the BSL IV laboratory and how that characterized their opposition. Ms. Moore commented:

> They [federal government] strategically picked this location because of the rural mindset. And they already have this rinky-dink little campus [RML] with extra land they could easily acquire. You could pay off anybody in this town for their land. So they had done that. They strategically picked this place because they know about rural communities and the lack of our voices in numbers and in strength and that's why they picked it. No, I mean it was hideous. They didn't listen.

Five participants explained how their perception of equity was impacted by a NIH internal memorandum in which reasons for why RML had been selected for the BSL IV laboratory were listed. According to participants, this memorandum had been obtained from the NIH by one of the opposition groups during the approval process, and it stated that their community was intentionally selected because it was rural. Mr. Davis explained that:

> We were interested in all kinds of internal NIH documents about the lab and one of the documents that we had was a memo from NIH that laid the rationale for building the lab. Part of the rationale was because it was in a rural community far removed from population centers. In the event of an accidental release of a BL four agent, it would be minimal impact to the community as opposed to a major metropolitan area . . . Basically it said we in this valley are pretty much sacrificial. They [federal government] knew that, they knew they could shut this valley down if something like that was to happen.

Another dimension of participants' concerns about equity was the high quality of life in Hamilton, Montana. Four participants claimed that the community had been selected because it was a desirable place for laboratory scientists to live compared to other locations. Ms. Brooks theorized:

> I think that the choice of putting it in Hamilton—I just feel it is an inappropriate place for a Biolevel four lab. I know why they do it, which is it is attractive to the PhDs that come here. The scientists want to live in a community and don't want to live on some base out in the middle of the desert.

Another reason that three opponents expressed as to why their community had been intentionally selected included the possibility of containment and quarantine in the narrow Bitterroot valley. Mr. Potter said:

> I knew why they [RML and NIH] were doing it here because there are only a few thousand of us living in the area. It would be way easy to quarantine the Bitterroot. Heck, if up there by Missoula they just put a roadblock. There are no roads around that.

The relatively low population in rural Montana was another reason why two participants claimed that their community had been unfairly selected. Mr. Adams noted:

> The one [biosafety laboratory] up by Boston, that one will never open as a level four. A lot of people up there. Here, who cares? You have to sterilize 30,000 people—hey that is better than Boston or New York or Washington. They don't want it in their backyard. They have the votes to do it. That is why the lab is here. . . It will only kill a few thousand people.

Perceived Lack of Economic Benefits from IRF expansion

Another prevalent unidimensional theme that characterized participants' descriptions of their opposition to the IRF expansion was the perceived lack of economic benefits from IRF expansion. This theme characterized three of the 10 opponents to the IRF expansion at RML. These participants noted that laboratory proponents stressed the economic potential of the expansion, but they claimed that the economic impact would

not be positive for individuals or the community. For example, Mr. Smith described how he perceived economic benefits:

> In fact, they [RML and NIH] were pitching it as an economic benefit to the community because people would be coming here to work at the lab. They would be buying homes and paying taxes. They said these would be the impacts and so on. . . So it won't have an economic benefit to the city. In fact, the impact will probably be negative.

Similarly, Mr. Adams noted:

> They hung $66 million in front of the people. If you look at a little community like this and they [community residents] say $66 million!? But you know they did not understand that to build that lab, it is a very specialized company. They bring in their own materials. They bring in their own people. Very little will be here. To put the equipment in, that all comes from somewhere else. They send their own people to install it. They might hire, when it is all done, hire six more people in the valley. Well that is ridiculous but that is the way it is. Sixty-five of that 66 million will go out of state.

On the other hand, three opponents claimed that the laboratory expansion would provide economic benefits to the community. However, they described how they disregarded potential economic benefits because of perceived "problems" that could result from the expansion. For example, Mr. Hill said "Not that it won't be really beneficial for the economy having this type of workforce here, but the risk." Mr. Potter expressed similar concerns:

> Why should they [community residents] be in favor of it? Yeah, it brings—there are some benefits—like these intelligent people come in and there are the benefits of the payroll. That is hard to see and pretty evident with some of problems. Especially potential problems.

Conclusion

Overall, several themes were found to characterize participants' opposition to the IRF expansion at RML. These multidimensional themes included a negative perception of the IRF expansion approval process, distrust in institutional authority, a negative

perception of potential IRF risks, and distrust in the justification for bioterrorism research. Unidimensional themes included a negative perception of the equity of IRF expansion and a perceived lack of economic benefits from IRF expansion. However, the extent to which each theme reportedly influenced each participant's opposition varied. As a result, the opposition movement, particularly within and between opposition groups, was not unified. For example, Mr. Potter explained:

> So, our organization was sort of split. There were people that were just very opposed to the whole concept of doing biological warfare research. Then others were not so concerned about the actual project but were very concerned that at least the law would be followed in terms of developing an environmental impact statement and following the NEPA process. So some of it was philosophical and some of it had to do with the law. . . We thought that we didn't have agreement in our organization so we thought it would be best just to stick to being a watchdog group and insuring the NIH followed all of the environmental regulations that were required for a project of this magnitude.

The lack of unification across the general opposition movement was also apparent between opposition groups. As Mr. Green explained, opposition groups had reached a compromise before mediation with the NIH in part because of their fragmented opposing views towards the IRF expansion:

> [Opposition group] wanted the NEPA process and the other groups wanted it gone. [Opposition groups] were really concerned about the objective of the outcome and [other opposition group] were interested in the process outcome. That became a big conflict in the end when the compromise came. Cause you had to give up the NEPA in order to get an objective compromise.

In conclusion, although a variety of themes were found to characterize opposition to the IRF expansion at RML, the extent to which each theme reportedly influenced participants' opposition varied. This variation in opposition is discussed in the next

chapter. The implications of this opposition to the IRF expansion at RML are also framed in the context of addressing whether opposition to a biolaboratory supports what is known about a community response to a high risk hazardous facility.

CHAPTER SIX- DISCUSSION AND CONCLUSION

The major research question addressed in this study was whether a biolaboratory is perceived to be a high risk hazardous facility by community members of Hamilton, Montana. Since 1927, RML in Hamilton has pursued scientific infectious disease research funded by the federal government. The current IRF expansion project at RML, which will include a BSL IV research laboratory, is funded by bioterrorism monies appropriated to the NIAID in 2001. In the BSL IV laboratory, scientists will be able to study the most deadly infectious diseases, some which may be potential bioterrorism weapons.

Therefore, the IRF expansion project at RML, which will include a BSL IV laboratory, was considered a representative case of a high risk biolaboratory for exploration. As the early and recent history of RML summarized in this study has demonstrated, some residents in Hamilton and the surrounding communities have viewed RML over the past 80 years as a high risk hazardous facility. In this study, the factors characterizing community opposition to the most recent expansion at RML are reviewed.

Similarly, this study addressed what themes might describe community opposition to a biolaboratory as a high risk hazardous facility and whether these themes might correspond to the key factors that previously have been found to explain community opposition to other types of high risk hazardous facilities. Although community opposition to high risk hazardous facilities has been widely examined, residents' perceptions of biolaboratories, as another type of a high risk hazardous facility, have not yet been explored. This exploratory study aimed to examine if themes characterizing

participants' opposition to a biolaboratory reflected the factors previously identified in studies of other high risk hazardous facilities.

RML as a High Risk Hazardous Facility

Several key events have historically characterized a view by many Bitterroot Valley residents that RML is a high risk hazardous facility. Before the establishment of RML, early spotted fever research was a dangerous endeavor in the Bitterroot Valley because of the high mortality rate. Over a period of 16 years of early spotted fever research, five researchers became infected with the disease and died (Philips 2000). In the early 1900s, local ranchers resisted tick eradication efforts as they destroyed with dynamite two arsenic dipping vats designed to eradicate ticks from the valley's cattle population (Philips 2000). Additionally, two local residents employed by the state to operate arsenic dipping vats died as they contracted spotted fever during this dangerous operation (Philips 2000).

In 1927, laboratory construction of a new spotted fever research facility in Hamilton, Montana was strongly opposed by local residents. Concerned residents feared that ticks with spotted fever would escape the facility, and threaten residents' health. Local residents opposed to the laboratory construction viewed it as a high risk hazardous facility. Although the laboratory was eventually built, resident fears were reportedly alleviated by the construction of a small, water-filled moat around the facility that would prevent ticks from escaping the laboratory.

As the history of RML reveals, the recent opposition to the IRF expansion is not the first time community residents' have opposed laboratory plans. RML, which local

residents refer to as the "tick lab", has been viewed as a high risk hazardous facility by many residents of the Bitterroot Valley for numerous years.

Themes Characterizing Opposition to the IRF Expansion at RML

The complex and interrelated factors characterizing opposition to high risk hazardous facilities in communities have been widely examined. Themes that participants expressed in describing their opposition to the IRF expansion at RML reflected factors that previously have been found to explain negative responses to proposed and existing high risk hazardous facilities. The themes found to characterize participants' opposition to the IRF expansion at RML include a negative perception of the IRF expansion approval process, distrust in institutional authority, a negative perception of potential IRF risks, distrust in the justification for bioterrorism research, a negative perception of the equity of IRF expansion, and a perceived lack of economic benefits from IRF expansion.

Other studies have found that very similar factors including distrust, risk perception, equity, and a perceived lack of economic benefits characterize opposition to other types of high risk facilities (Murdock et al. 1999; Spies et al. 1998). Thus, this study reflects the prior literature that has examined opposition to other types of high risk hazardous facilities. However, participants' negative perception of the IRF expansion approval process as a major theme characterizing their opposition stood out as a more prevalent factor than the community participation factor previously found in other studies (Murdoch et al.1999; Spies et al. 1998; Wakefield and Elliot 2000). Additionally, unlike the previous literature, participants' distrust in the justification for bioterrorism research was a unique theme that emerged in this study.

Similar Findings to Previous Literature

Four themes characterizing participants' opposition to the IRF expansion at RML are similar to the factors of distrust, risk perception, equity, and perceived lack of economic benefits found in the prior literature.

Distrust

Previous studies have found that distrust in high risk hazardous facility management and technology experts impacts residents' opposition to such facilities (Albrecht, Amey and Amir 1996; Couch and Kroll-Smith 1994; Flynn et al. 1992; Jenkins-Smith and Kunreuther 2001; Sjöberg 2004; Wakefield and Elliot 2000). In this study, distrust was a theme found to characterize participants' descriptions of their opposition to the IRF expansion at RML. The dimensions of distrust that characterized participants' expression of opposition to the IRF expansion included distrust in laboratory scientists at RML, distrust in the federal government, and distrust in information about RML as sources of reliable information were often rumors and stories.

Like residents in previous communities studied, participants doubted the infallibility of RML scientists in insuring laboratory safety. As Mr. Hill noted, "Humans make mistakes all the time. And we are always going to." Thus, participants felt that human error by laboratory scientists was inevitable, and their distrust was magnified by RML claims of infallibility. Participants' opposition was also characterized by distrust in the federal government. This dimension was reportedly contextualized within a broader distrust of the federal government. For example, Mr. Potter said, "You are right we don't trust the government. We know what they [federal government] do. We can see it on TV and read about in the paper." In addition, distrust of the federal government was fostered

by participants' negative perception of how the IRF approval process was handled by the NIH. This was evident when participants suggested that the government was "hiding things" and "going through the motions" during the IRF approval process.

One additional dimension of distrust found in this study has not been identified in the findings of previous literature. Participants expressed distrust in information about RML because sources of reliable information were often rumors and stories. Compared to other studies of high risk hazardous facilities, this is a unique dimension of distrust that is embedded within the RML's long historical presence within the community. Other studies have not found this to be a dimension of distrust characterizing residents' opposition to high risk hazardous facilities. I suggest this finding may be due to the increased bureaucracy, primarily in hiring more employees, and residents' perceptions of decreased transparency at RML. Currently, over 250 people are employed at RML and the laboratory is not open to the public. Therefore, rumors and stories that circulate about RML exist as residents speculate about the unknown research that is conducted by unfamiliar scientists taking place in their community.

Risk Perception

In addition to distrust, previous studies have also found that a negative risk perception affects residents' opposition to high risk hazardous facilities (Bourke 1994; Flynn et al. 1992; Jenkins-Smith and Kunreuther 2001; Krannich and Albrecht 1995; Spies et al. 1998). This study also found that a negative risk perception characterized participants' opposition to the IRF expansion at RML. This theme was characterized by two dimensions, including dread of potential accidents and a fear of the unknown.

Participants' risk perceptions were strongly characterized by their dread of a potentially devastating biological agent release from the laboratory. Similarly, other studies of community response to high risk hazardous facilities have found that residents dread potential accidents and the ensuing contamination to public health (Bassett, Jenkins-Smith and Silva 1996) and the environment (Albrecht el al. 1996; Baxter, Eyles and Elliott 1999; Krannich & Albrecht 1995). Participants described their dread of an accidental release of these deadly biological agents. In this study, dread of the IRF expansion at RML is apparent because the biological agents that can be studied in a BSL IV laboratory are extremely deadly. For example, Ms. Moore noted, "Any BSL four agent [release] would be devastating, absolutely devastating."

Another dimension of negative risk perception found to characterize participants' opposition was a fear of the unknown. This theme was closely related to participants' dread of an accidental biological release since participants feared the unknown outcome of an accidental biological release. Similarly, risk perception studies have found that people perceive hazardous facilities as unknown risks (Slovic 1987). Participants' fears of the unknown were characterized by uncertainty about what could happen in the event of a biological agent release from the BSL IV laboratory. In this study, fear of the unknown was a prevalent dimension of negative risk perception because biological agents found in a BSL IV laboratory are very high risk since these deadly diseases cannot yet be cured. Additionally, participants' fears of the unknown were elevated when their safety questions about potential releases were not adequately answered in the IRF approval process. For instance, Ms. Moore noted, "They [RML and NIH] didn't have an answer [to questions]. They had no idea."

Equity

Equity issues were another result from this study that reflects findings from previous studies of high risk hazardous facilities (Albrecht et. al 1996; Jenkins-Smith and Kunreuther 2001; Murdoch et al. 1999; Spies et al. 1998). Participants' opposition was characterized by a perception that their community was intentionally selected because it is a rural locale. This finding reflects results from previous studies, but in this study, the theme of equity is less multidimensional. Equity factors that have been found to influence community opposition to high risk hazardous facilities include the beliefs that the community has been targeted because it is poor and ethnic as well as rural (Albrecht et. al 1996). However, this study did not find that equity issues of ethnicity or class were salient themes characterizing participants' opposition to the IRF expansion at RML.

Rather, rurality emerged as the primary equity dimension characterizing participants' opposition to the IRF expansion at RML. While many other high risk hazardous facilities are primarily located in rural areas, no other biolaboratories are yet located in rural areas so that RML is the first rural locale hosting a BSL IV laboratory. Participants' descriptions of the equity question about siting a BSL IV laboratory in their community included the perception that Hamilton had been intentionally selected by the federal government because of its rural location. Participants' perceptions of the inequity were magnified by the NIH internal memorandum that explained why their rural community had been identified to host the BSL IV laboratory. Rurality also emerged as the primary equity factor characterizing participants' opposition in part because of their

distrust of the federal government. As Ms. Brooks noted, "People back East [in the United States] don't even think that Montana is in the same country. In a small town of Montana, we are so expendable."

Perceived Lack of Economic Benefits

Previous studies have found that residents' perceived lack of economic benefits from high risk hazardous facilities impacts their opposition (Bourke 1994; Krannich and Albrecht 1995; Murdock et al. 1999; Spies et al. 1998). Similarly, this study also found that some participants characterized their opposition in terms of a perceived lack of economic benefits in noting that any possible potential economic benefits of the IRF would be offset by the perceived costs associated with the IRF expansion. Perceived costs of the IRF expansion primarily included the accidental release of a BSL IV biological agent. As Mr. Potter noted, "But when something bad happens, it's like way bad . . . but if it does go wrong, what is the price we have to pay for that? It could very steep." In this study, participants perceived the costs associated with the IRF expansion at RML as outweighing any potential economic benefits.

In sum, four of the themes from this study reflect the results of prior literature examining opposition to other types of high risk hazardous facilities. Additionally, two themes from this study are unique and do not reflect findings from the prior literature of community response to high risk hazardous facilities.

Unique Findings

Two unique themes were found to characterize participants' opposition to the biolaboratory expansion. These themes included a negative perception of the IRF expansion approval process and distrust in the justification for bioterrorism research.

Participants' perceptions of the approval process stood out as a more prevalent theme than related factors like community participation that have been previously found in other studies examining community response to high risk hazardous facilities (Murdoch et al.1999; Spies et al. 1998; Wakefield and Elliot 2000). In contrast to the previous literature, participants' distrust in the justification for bioterrorism research was a unique theme that emerged in this study.

Negative Perception of the IRF Approval Process

Negative perception of the IRF approval process was a stronger theme in this study than the related factor of attitudes toward community participation identified in the previous literature. Previous studies have found that residents have been generally satisfied with the public process of approving high risk hazardous facilities (Murdoch et al. 1999; Spies et al. 1998; Wakefield and Elliott 2000). However, participants in this study reflected strong dissatisfaction with the IRF expansion public participation process. Negative perception of the public process was the most prevalent theme found to characterize participants' descriptions of their opposition to the IRF expansion at RML. Negative perception of the public process was found to be a multidimensional theme, which included their perception of a predetermined outcome, their concern with unaddressed safety issues, their experience with unanswered questions, and a sense of feeling powerless.

I suggest that this theme, to a certain extent, may be due to local community culture. In this remote corner of Montana, local citizens have a strong history of grassroots protest and organizing. In the case of the proposed IRF expansion, Bitterroot Valley residents have historically protested decisions regarding the establishment and

operation of RML. For example, in the early 1900s, local ranchers destroyed arsenic vats designed by entomologists to eradicate ticks from the valley's cattle population to curb the spread of spotted fever. Later, in 1927, over 400 residents in the Bitterroot Valley opposed the initial construction of RML in Hamilton. In addition to RML centered protests, residents of the Bitterroot Valley have more recently engaged in a series of controversies including the state's expansion of Montana State Highway 93, Bitterroot National Forest land management policies, county growth management policies, and grizzly bear reintroduction by the U.S. Fish and Wildlife Service.

As frequent protestors, local citizens in the Bitterroot Valley, especially environmental groups, are familiar with national environmental laws, especially the National Environmental Policy Act (NEPA). Environmental groups played a key leadership role in the overall opposition movement against the IRF expansion at RML. Individuals from these groups were familiar and experienced with the NEPA process and were able to assist, and to some extent, lead the opposition movement. Although participants in this study had not previously been involved with a biolaboratory expansion approval process, they were familiar with the NEPA process.

In addition to participants' familiarity with the NEPA process, their negative perceptions of the approval process were impacted by their belief that NIH did not adequately follow the NEPA process. For example, Mr. Potter said, "NIH apparently had never done an EIS before because it really is one of the lamest EIS imaginable. They did some things that are just blatantly illegal." Thus, participants' belief that the NEPA process was not adequately followed by NIH was a key element in shaping their distrust.

Distrust in the Justification for Bioterrorism Research

In addition to the stronger prevalence of a negative perception of the IRF public process, participants' distrust in the justification for bioterrorism research was a unique theme that emerged in this study. This theme had not been identified in previous studies as a factor characterizing community response to a high risk hazardous facility. Distrust in the justification for bioterrorism research emerged as a multidimensional theme characterizing participant's opposition to the IRF expansion. The dimensions of the theme included participants questioning both the motivation behind and also the need for bioterrorism research. Participants questioned the motivation for bioterrorism research when they explained that a fear of bioterrorism in general, rather than an actual terrorist threat was the major reason for the IRF expansion. However, participants' responses varied regarding the need for bioterrorism research. Some participants supported bioterrorism research while others did not.

Distrust in the justification for bioterrorism research is a unique theme in this study of a community response to a biolaboratory because this type of facility is equipped with the unique technology to pursue bioterrorism research. Thus, since other high risk hazardous facilities do not conduct bioterrorism research, it has not been found to characterize opposition to other high risk hazardous facilities. I suggest that this theme, and the ambiguity of participants' views of bioterrorism, is a direct response to the terrorist attacks occurring on September 11, 2001 and the ensuing nation-wide fear of terrorism. Although terrorism is not entirely new, this type of terrorism, including

commercial airplanes as weapons and biological or chemical attacks, is particularly dreaded and ambiguous. Thus, it appears that terrorism has emerged as "a new species of trouble" (Slovic 2002).

Participants in my study had to grapple with terrorism as "a new species of trouble" and the institutionalizing of bioterrorism research in their community. To some extent, their reaction to bioterrorism research may have been mixed because bioterrorism is a relatively new phenomenon. Participants who opposed bioterrorism research also resisted the institutionalizing of risk because these agents could be misused by the federal government. Mr. Potter noted, "I think we have some crazy people running this country and it would not be beyond them to misuse the research that is coming out of there [RML]." Thus, these participants' stance against bioterrorism research was primarily shaped by their distrust in the federal government and what federal officials could do with bioterrorism agents or research.

Participants who supported bioterrorism research expressed a perspective that reflected the NIMBY syndrome (Fitchen 1991; Portney 1991). They approved of bioterrorism research, as long as it was not conducted in their community. As Mr. Adams noted, "A level four lab belongs in a place like down at the Nevada Test site. Someplace like that where there is 80 miles of buffer zone between where the public can get to and where the lab is." Most participants' perspectives often reflected the NIMBY syndrome since most participants did not want the BSL IV laboratory located in their community. Some participants rejected not only for their own community, but other potential locales that may be affected by biolaboratories. Thus, to some extent, they justified their NIMBY response in their expressed opposition to setting precedence for

future communities' encounters with proposed biolaboratories. Mr. Davis said, "If we don't hold them [NIH] to a standard . . . if they get away with it, what happens to NEPA? This is for other people's backyard."

Fragmented Opposition to the IRF Expansion

Participants' descriptions of their opposition to the IRF expansion at RML were characterized by several themes; however, the extent to which each theme influenced each participant's opposition varied. Thus, the descriptions of opposition to the IRF expansion varied and were somewhat fragmented.

Their fragmented descriptions may be partially explained by participants' difficulty in "framing" their opposition (Benford and Snow 2000). Frames are "action-orientated sets of beliefs and meanings that inspire and legitimate the activities and campaigns of social movement organization" (Benford and Snow 2000:614). In this study, a variety of frames seemed to support participants' opposition to the IRF expansion at RML. Every participant's opposition was characterized by a unique narrative discourse in expressing the most prevalent themes. Some of the participants did not want the expansion to occur at all, while others only wanted to ensure that the public process was adequately followed. Thus, the "master frame", or the general and primary focus of the opposition, was not well defined by the movement (Benford and Snow 2000).

Additionally, the opposition groups varied in their position about the IRF expansion. Previously established local environmental groups struggled to frame their opposition to the IRF expansion. Mr. Green noted, "[Organization name] is painted as a [environmental issue], so any time you get out of that core thing that brought them

[organization members] together they were split over it . . . They were kind of split. They didn't want to be anti-lab." Thus, to some extent, previously established local environmental groups struggled to frame their opposition because the IRF expansion at RML was a new issue that challenged the boundaries of their existing organization's mission and purpose. Thus, framing of the issue by opposition groups was disjointed.

The fragmented opposition may also be explained by the unfamiliarity of the biolaboratory and bioterrorism issues. Although RML has been operating within the community for over 80 years, a biolaboratory expansion approval process has not recently occurred. Residents, to some extent, were unfamiliar with biolaboratories and the technology involved with BSL IV laboratories. Opposition groups that became involved with this issue were not familiar with other biolaboratory expansions. Additionally, the threat of bioterrorism and the institutionalizing of bioterrorism research is a relatively new phenomenon. Because of these unfamiliar issues, uncertainty about their significance and impact locally in the Bitterroot Valley created the fragmented opposition.

Opposition Transformation into Acceptance of the IRF Expansion

For communities affected by high risk hazardous facilities, it has been suggested that residents' experience the "process of negotiation" (Wulfhorst 2000). During this process, residents move beyond opposing a high risk hazardous facility and begin to accept and familiarize themselves with the new facility. Following Wulfhorst (2000), I suggest that participants in this study experienced a transformation from opposition to the IRF expansion to an unwilling acceptance of the BSL IV laboratory. Ms. Jackson commented, "In the beginning it was an opposition . . . I personally was too--totally

opposed to it [IRF expansion]--and I did not want to see that happen here. As time went on, my views, my attitudes--maybe not my views--changed. I'm still opposed to it but my attitudes toward the reality of it happening changed."

This acceptance may be due to their negative perceptions of the public process and that the IRF expansion at RML was a predetermined outcome. Ms. Brooks noted, "We fought as hard as we could. Then we just, some of us just threw in the towel and went home." Additionally, participants may have begun to accept the IRF expansion because of RML's long historical presence in the community. Thus, they perceived only a slim possibility that RML would cease to exist in the community.

Although participants' opposition to the IRF expansion at RML was transformed into an acceptance, it seemed this acceptance was only a final resignation to the inevitability of the outcome. Thus, participants "settled" for safety concessions from NIH. Ms. Peterson said, "We honestly couldn't go into mediation saying 'we don't want the lab ever' standpoint. There is nothing we could gain at that point."

Participants' transformation from an opposition into an acceptance of the IRF expansion was difficult. Mr. Hill commented, "As far as that part [outcome], it was kind of disheartening. You know, to do all that work and see it just kind of swept under the carpet." Participants struggled to accept the futility of their resistance. For example, Ms. Jackson said, "As soon as the record of decision was out, it was like okay. I had come to that reality. I knew it was going to happen. I was done. I am done, I am done. I have put in my time and I've done everything I could possibly do." Thus, although participants' opposition transformed into an acceptance of the IRF expansion, it was a troublesome process.

Limitations of the Study

The first limitation of this study is that I only explored the perspectives of those opposed to the IRF expansion at RML. Although the perspectives of those opposed to the opposition are important in understanding residents' reactions to a biolaboratory expansion, these only represent a particular selection of the wide variety of possible perspectives. Hence, this exploration ignores the perspectives of those who supported the IRF expansion at RML. An exploration of the perspectives of those supporting the IRF expansion would provide a more in-depth and broader understanding of a community's response to a biolaboratory expansion. Furthermore, an exploration of other points of view could increase the understanding of how and why people's perspectives of a biolaboratory expansion may vary.

Another limitation of this study is the small number of participants interviewed. Only 10 residents opposed to the biolaboratory expansion were interviewed in this study. This small number limits my ability to generalize the findings of this study to represent all of those opposed to the biolaboratory expansion. Additionally, it limits my ability to generalize the findings of this study to residents' reactions to biolaboratories and other types of high risk hazardous facilities in similar communities. Furthermore, since my participants were selected through snowball sampling, I do not know if my sample adequately represents all residents of the community that were opposed to the IRF expansion at RML.

In addition to a small number of participants, another limitation of this study was that the data were collected after the IRF expansion approval process had been completed. Data for this study were collected from August to November, 2005. The

decision to build the IRF expansion had already been announced in June, 2004 and the settlement between opposition groups and the NIH had been reached in September, 2004. Thus, nearly one year had passed when I collected the data for this study. This may have influenced participants' memories and descriptions of their opposition to the IRF expansion.

Conclusion

The purpose of this study was to explore whether a biolaboratory is perceived as a high risk hazardous facility. The response of participants in this study to the biolaboratory expansion reflects, to some degree, the community response of residents to other proposed or existing high risk hazardous facilities. Like community responses to other high risk hazardous facilities, this study found biolaboratories elicit distrust, negative risk perceptions, negative equity perceptions, and a perceived lack of economic benefits. However, as a different type of high risk hazardous facility, this study also found a unique community response to biolaboratories in participants strong negative perceptions of the public process and distrust in the justification for bioterrorism research. Thus, I conclude that based on the themes characterizing opposition to the IRF expansion at RML, that biolaboratories are perceived to be another type of a high risk hazardous facility.

Erikson (1994) has suggested that society is plagued by a "new species of trouble" that is characterized by technological disasters that provoke dread and uncertainty. Are biolaboratories becoming a "new species of trouble"? Biolaboratories are institutions that combat infectious diseases. As I discovered in this study, bioterrorism research has been incorporated into the purpose of biolaboratories. This

institutionalization of bioterrorism reportedly will decrease risks associated with possible bioterrorism attacks. However, as this study also revealed, the institutionalization of bioterrorism research is not a risk-free endeavor. New risks, such as a possible terrorist attacks on a biolaboratory, release of a deadly biological agent into a host community, or the potential for bioterrorism research to create biological weapons, may emerge from the institutionalization of bioterrorism research. Thus, this study has found that biolaboratories, as an unexplored type of high risk hazardous facility, indeed may be considered a "new species of trouble."

Appendix A. BSL description (NIAID 2004b).

BSL-1 labs are used to study agents not known to consistently cause disease in healthy adults. They follow basic safety procedures and require no special equipment or design features.

BSL-2 labs are used to study moderate-risk agents that pose a danger if accidentally inhaled, swallowed or exposed to the skin. Safety measures include the use of gloves and eyewear as well as hand washing sinks and waste decontamination facilities.

BSL-3 labs are used to study agents that can be transmitted through the air and cause potentially lethal infection. Researchers perform lab manipulations in a gas-tight enclosure. Other safety features include clothing decontamination, sealed windows, and specialized ventilation systems.

BSL-4 labs are used to study agents that pose a high risk of life-threatening disease for which no vaccine or therapy is available. Lab personnel are required to wear full-body, air-supplied suits and to shower when exiting the facility. The labs incorporate all BSL 3 features and occupy safe, isolated zones within a larger building.

Appendix B. Bitterroot Valley Population and spotted fever cases (Figures documented by Philip 2000).

Year	Population	Spotted fever cases
1870	370	1
1880	1222	16
1890	3,950	83
1900	7,822	141
1910	11,666	86
1920	10,207	37
1930	11,647	39
1940	13,040	8
1950	12,721	1
1960	12,341	4
1970	14,409	11

Appendix C. Interview Guide.

1. When you first heard about the RML expansion, how did you react to the news?
   Probe: Can you describe how/when you heard about the proposal?

2. What was your biggest concern with the expansion project?
   Probe: What were some other concerns you had?

3. What did you do to express your concerns?
   Probe: Did you join an opposition group? How and when did you get involved?
   Probe: How would you describe your involvement with this group?
   Probe: What was the group's viewpoint of the RML upgrade?

4. Can you describe your viewpoint of the RML expansion project?
   Probe: Did you opinion change at all over time? In what ways?
   Probe: How was upgrade approval process handled by RML?

5. Before this lab expansion issue began, how did you feel about the lab?
   Probe: Do you remember the last upgrade to a BL 3?
   Probe: Did the events of September 11 impact your personal response to the lab expansion? In what ways?

6. How has the expansion approval process impacted the community?

7. Is there anything else that is important you would like to mention?

I am trying to represent all those whom I should in this study. Is there anyone you might suggest I talk to?

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