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STORIES OF CONTAMINATED WASTE DUMP SITES
IN AMSKAPI PIKUNI BLACKFEET COUNTRY

By

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B.A.S., University of Montana, Missoula, MT, 2009

Professional Paper

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Chapter 1

Statement of the Problem

Amskapi Pikuni history has been passed down via oral tradition for hundreds of generations; with creation stories beginning some 20,000 years ago, in the territory where they are at present. Their natural rhythm of life was in the seasonal movement of camps and the summertime gathering together of their many bands. This was the traditional time of passing on the history of the confederated tribes and had always been the way of the Siksikaitapi, “the Original People” (the Blackfoot Confederacy People). Stories were accepted as fact, not just as anecdotal tales. A record of population, seasonal hunts, warrior activities and society responsibilities, gatherings of nations, ceremonial structures, band movement and simple day-to-day lifestyles all emerged from verbal retellings. For example, accounts of hunting buffalo on foot, before the horse came to the Northern Plains, go unquestioned. Stories of the diverse ways in which the buffalo jumps along the cliffs above Lower Two Medicine River were used are featured in many stories, as well as the “last” buffalo hunt along the Sweet Grass Hills.

While tools, skulls and bone fragments have been found at the sites, the stories are much richer than just the archaeological record. There is little tangible evidence regarding most aspects of the traditional oral history record of the Pikuni, yet few Pikuni doubt that the stories are true. This oral history keeping did not change with the advent of the non-native population’s successful access to and “ownership” of traditional Blackfoot Confederacy territories. However, this form of history keeping was greatly minimized by the cultural and societal changes that were a consequence of reservation boundaries no longer allowing the seasonal gathering of nations, as well as the forced assimilation practices of the boarding school era. It became illegal to continue their form of government and spirituality. Abhorrently, it was even illegal to keep their children in their own homes, with their families, after the age of five years old. Along with these unspeakables, came the illegality of their language. Even in 1980’s many of the elder women would still speak Blackfeet with their hands up covering their mouths or remove themselves to a back room, to speak softly behind a closed door (Wetselline, 2011).

For many decades, people of the Amskapi Pikuni Nation (also known by others as Southern Blackfeet or Southern Piegan) have shared stories of “something bad” being dumped secretly within the boundaries of their lands, the last of the hunting and gathering territories that still remain in Blackfeet sovereignty. While the actual dumping events took place about fifty years ago, there may still be time to recover direct evidence of toxic disposals. Over the years, stories addressing contaminated waste and the locations of rumored dump sites have also been linked with perceived cancer clusters among residents who lived below the Hudson Bay Divide ridge and along the Del Bonita Road. In 1992, Wilbert Fish, a traditional Blackfeet herbologist, became alarmed when he felt that more than one-quarter of the approximately 90 residents who lived below the Hudson Bay Divide Ridge had either contracted or succumbed to various cancers (Fish, 2010). Unfortunately, he relates that he shared information that he had been gathering with a tribal program officer and no record of these materials, after this interaction, has yet been found.

The Blackfeet community suffers from some of the highest cancer rates in the state of Montana, with some types being over 500% higher than other ethnicities (MT tumor registry, 2004-2008). As this is being written, four more current residents of the Hudson Bay Divide area have died from cancer recently. Very little time remains to interview and tease out first-person accounts from those directly impacted by past dumping transgressions. Given the ongoing loss of life and the Blackfeet people’s concerns about toxic waste disposal on their lands, the objective of this study is to transform stories into factual evidence so that the health and well-being of the people who live on the land can finally be protected.

The research questions that emerge from tales of toxic dumping and possible associations with subsequent incidence of cancer are:

1. What historical events led toxic producers to target the Blackfeet tribal lands as a possible location for disposal of hazardous wastes (Chapter 2)?
2. What evidence exists in documents that tie toxic producers and government agencies to Blackfeet Country (Chapter 3)?
3. What data are needed to connect the incidence of cancer in Blackfeet Country to sites where toxic substances were used or disposed (Chapter 4)?

4. Are there lingering signatures of toxic materials still detectable at sites suggested in the community stories (Chapter 5)?

This professional paper outlines the initial findings that emerged when looking for any evidence regarding the disposal of toxic waste within Blackfeet lands. It begins with a brief history of the non-Indian subjugation of the Blackfeet (Chapter 2) to provide a background against which to consider the actions of toxic waste disposal. It then recounts the various databases and literature searched to find historical records and the personal contacts made to receive first person accounts (Chapter 3). While there are anecdotal stories of cancer clusters in Blackfeet Country, it takes much more to provide defensible epidemiological evidence of their existence. Chapter 4 establishes guidelines for what types of quantitative data must be assembled and analyzed before definitive conclusions can be drawn regarding them. Next, preliminary field testing data from portable radiation counting measurements and a cursory set of water sample analyses are presented (Chapter 5). Finally, conclusions from this study and recommendations to extend this work into a doctoral dissertation are given (Chapter 6).

Chapter 2

Subjugation of the Southern Pikuni

The purpose of this chapter is to set a historical background against which to consider a proposal from the US Government to dispose of nuclear waste or other toxic materials in Blackfeet Country. It outlines a protracted series of actions that were perpetrated against the Blackfeet people by the approach of European descendents in the form of “westward expansion”. The policies and practices systematically endeavored to remove the residents’ ties to their land, their culture and their identity such that government or business interests could invade the region. By 1961, when the Hanford Atomic Reservation (also known at that time as the Hanford Engineer Works) proposed to bury fifty million gallons of spent radioactive liquids from uranium enrichment procedures, there was little basis and understanding in the community with which to assess the risks that would come with it. Resources were so limited to oppose this disposal that although covert activities were noticed and survive in the oral tradition, no concerted investigation or legal procedures have yet been mounted. The Blackfeet Tribal Business Council formally rejected this proposal a year after it was received. However, it is believed that there could have been some “exploratory dumping”. Tribal members recall “large trucks loaded with barrels” (Running Crane & Bull Shoe, 2010) being seen at multiple locations during this time. Records have also been found that implicate a non-tribal member, Hugh Black. This written account suggests that Hugh Black contracted with a government contractor to allow dumping on lands that he had “purchased” within the Blackfeet Nation.

Pre-European Contact

The Amskapi Pikuni are the southernmost members of an independent confederation of four Blackfoot warrior tribes of the northern plains. For hundreds of generations they fiercely controlled a vast region stretching westward along what is now known as the Canadian and Montana Rocky Mountains (Mii stah kis tsi), from the North Saskatchewan River (Ponoka Sisaahata) on the northern boundary, to Missoula’s Hellgate canyon on the southwest. From here their territory extended eastward along the Yellowstone River (Otah kooi tah ta yi) to Crow Country, skirted the edge of the Northern Cheyenne tribal lands and ran northwards along the

western margin of Sioux territory (parallel to what is now the North Dakota border). Blackfoot lands extended north, past the Sweet Grass and Cypress Hills and the Medicine Line or United States-Alberta-Saskatchewan borders (Kaayih kimi koyi). It rose up past what is now Hobbema, Alberta; to the northernmost boundary set by the North Saskatchewan River, just below the Northwest Territories (Figure 2.1). The four different member nations of the Blackfoot Confederacy, sovereign from north to south, are the Northern Pikuni or Aapatohsi Pikuni, the Siksika (Siksikawa), the Kainai (Blood) and the Southern Pikuni or Amskapi Pikuni. [In this text, when referring to all member nations of the Blackfoot Confederacy, they will be referred to as Blackfoot. When referring to only the Southern Pikuni in Montana, the nation will be referred to as Amskapi Pikuni, Pikuni, or Blackfeet]. The Amskapi Pikuni is the only band that remained within what is now known as the United States.

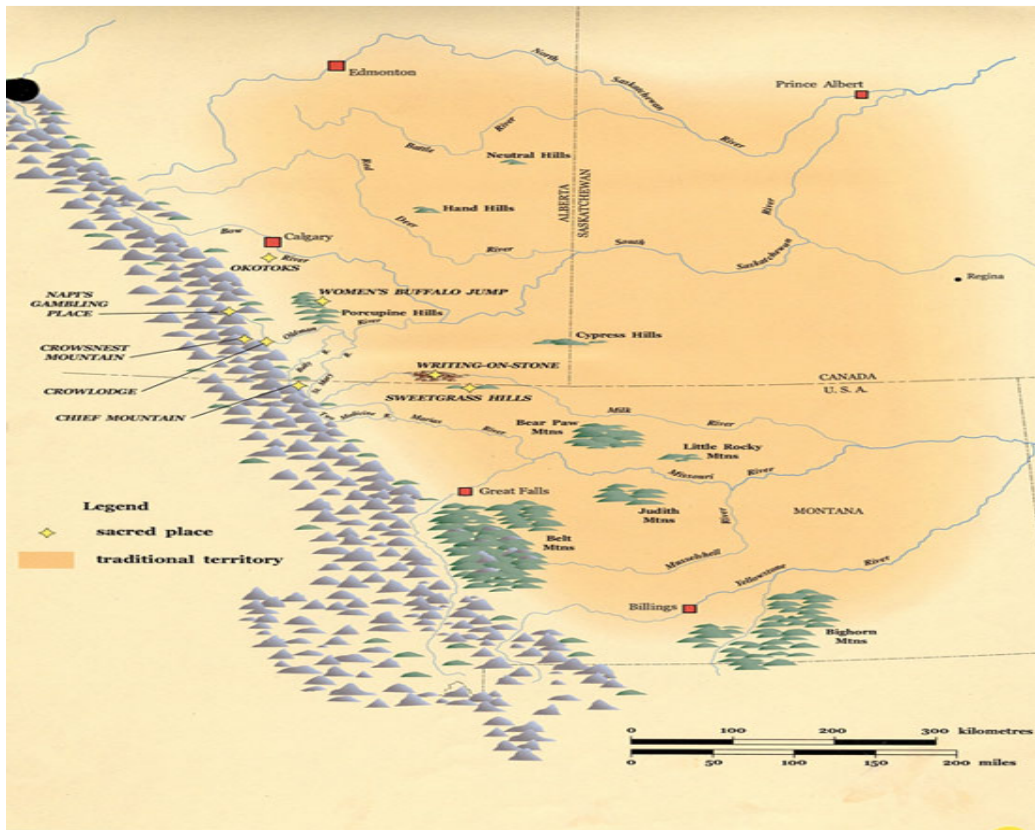


Figure 2.1. The Blackfoot's traditional territory spread eastward from the Rocky Mountains, across the northwestern plains (Glenbow Museum, Calgary).

The expansive lands that the Blackfoot Confederacy had fiercely defended for tens of thousands of years diminished with the coming of non-native trappers and settlers from the East, North and South. It was not that the Blackfeet lost a series of battles with soldiers. Instead, disease to which they had no acquired immunity, the contracted slaughter of buffalo, starvation, the methodical and organized introduction of alcohol, governmental land grabs, the forced removal of children to boarding schools, and an early morning surprise massacre of a camp of elders, women and children (Bear River, 1874) rapidly decimated their numbers. Land was forcibly taken by a series of actions, generally initiated in Washington, DC, which to the Blackfeet at that time, seemed as far away as the moon. It is understood that these debilitating impacts were not purely a result of culture collision with non-natives, but were part of an organized governmental plan to marginalize indigenous peoples and their land-base.

Disease:

McClintock (1910) estimated the total Blackfoot population in 1780 at 30-40,000. A smallpox epidemic that erupted in 1781-82 was probably initiated by contact with the Northwest Fur Company and Hudson Bay Company trappers, after they set up posts on both branches of the Saskatchewan River. This resulted in a die-off of about half of the Confederated Blackfoot on both sides of what was to become the Medicine Line, or the Canadian-American Border; claiming an approximated 20,000 lives. Another third of the population was lost to a measles epidemic in 1819 and in 1836 many Confederated Blackfoot children died of diphtheria or “strangulation of the throat” (Blackfeet Nation, 2011). A subsequent smallpox epidemic a year later came with the first steamboat to arrive at the headwaters of the Missouri River in 1837, the S.S. St. Peters. It is estimated that of the remaining Southern Pikuni, there were 4,000 fatalities between 1837 and 1838 (Kohn, 2008). The brunt of this smallpox epidemic was so horrendous and prolonged that it was recorded in the Southern Pikuni winter count for two years. Then, in 1864, an epidemic of scarlet fever decimated the surviving Blackfoot bands. By the spring of 1865 over 1,100 more Blackfoot had died. The Confederated Blackfoot then attacked the Rocky Mountain House, a notorious “whiskey fort” and trading establishment in the Cypress Hills, blaming the British traders for the scarlet fever epidemic. By 1890, over three-fourths of the

remaining Pikuni had died from recurring smallpox, measles, scarlet fever, diphtheria and starvation. Only 4,560 Southern Blackfeet remained in 1907 (Mooney, 1928).

Contracted Slaughter of Buffalo:

In 1800 there were around 60 million bison in North America (Yellowstone Buffalo Foundation, National Park Service, 2011). “In the second half of the 19th century European buffalo hunters, armed with powerful long-range rifles, began killing the animal in large numbers (Figure 2.2). Individual hunters could kill 250 buffalo a day” (Simkin, 1997). It is estimated that over 7.5 million buffalo were killed from 1872 to 1874 (Ellis, 1970). The bison were slaughtered nearly to extinction. In 1902 the remnants of the herds that had once swarmed the Great Plains, tucked away in Yellowstone National Park, numbered just 23 (Kaeding, 1997). The much anticipated result of this wanton slaughter was the rampant starvation of members of all of the Great Plains’ tribes.



Figure 2.2. Evidence of the wanton slaughter of bison (Innaiks).

http://en.wikipedia.org/wiki/File:Bison_skull_pile_edit.jpg accessed 11/22/11

Here are examples of historical accounts of this effort: A “blow to the Blackfoot came in 1883 with the complete and final extinction of the last great (bison) herd, for with the bison went their livelihood and the heart and soul of their culture” (Grinnell, 1912). Essentially, the Blackfoot peoples operated on a ‘buffalo economy’. “When the buffalo are extinct, they too [the American Indians] must dwindle away” (Francis Parkman, 1849). In an 1875 speech to the Texas legislature, General Philip Sheridan summed up the feelings of the day: “[the buffalo hunters] have done more to settle the vexed Indian question than the entire regular army has done in the last thirty years. They are destroying the Indians’ commissary.” “All this slaughter was a put up job on the part of the government to control Indians by getting rid of their food supply.....it was a low down dirty business” (Abbot, circa1880). By the 1880’s over 5,000 hunters and skinners were involved in the wanton slaughter. The program targeted all Native Americans who depended on bison. “The suddenness of it all was appalling. As much as it strains today’s imagination, the white men slaughtered their buffalo in hundreds of thousands, utterly obliterating in one season’s kill the southern Kansas herds on which the Cheyennes and Arapahoes had, in large measure, subsisted” (Haley, 1976). The killing of buffalo was supported by the U.S. government in order to undermine the survival of the Plains Indians. “When we get rid of the Indians and buffalo,” enthused General Nelson Miles, commander of a garrison near Fort Keogh, Montana, in 1876, “the cattle...will fill this country.”

The Introduction of Alcohol:

Adding to the adverse problems thrust on the Confederated Blackfoot people was a network of “whiskey forts” that was strategically placed along the outer boundaries of their Canadian and American territories. Between 1860 and 1875 great quantities of whiskey were dispensed first as “friendship” offerings, but later evolved into trade goods as alcohol dependencies developed. The native cultures had no previous experience with this intoxicating liquid. Alcohol consumption promptly led to a large number of fatalities (Lacey, 2006). These fatalities were caused both by poor quality of the alcohol itself as well as the effects it precipitated. The Siksikaitapi have only had interaction with alcohol for the last 150 years, as opposed to people of

European descent who have known alcohol since the Neolithic period of 10,000 B.C. (Patrick, 1952).

Governmental Land Theft:

The Southern Blackfeet were initially successful in keeping non-natives out of their vast territories and were the last tribe of America's first people to be "put on a reservation". Oral history accounts tell of the people's choice to refuse trade with both the fur trappers and the company traders, while many other neighboring tribes did not. Later trade was only established because of the firearms that were being acquired by the traditional enemies of the Blackfeet. A lengthy series of complex land-theft treaties, executive mandates and congressional acts, transferring Blackfeet lands to the U.S. government and private non-Indian landowners. The problem was, none of the Blackfeet could read, understand or speak English. The rare treaty that was actually "signed" by Blackfeet was done so by trusting that the government-employed translators accurately indicated its contents:

1830 – The Indian Removal Act was promulgated in Washington, DC, the first major legislative policy disregarding the moral, legal and political rights of American Indians. It displaced Native Americans from the South into territories west of the Mississippi in what has come down as the "Trail of Tears". It was based on an 1823 court decision that Indians could occupy lands but not hold title to them.

1851 – The Fort Laramie Treaty of 1851 (in which Blackfeet did not participate) allotted a large swath of the northern plains to other tribes. The treaty language made it possible for roads and forts to be built on Native lands. Though the Blackfeet were not present, Article 5 defined their territory, using the Musselshell, Missouri, Yellowstone Rivers and the Rocky Mountain Range as markers. The Blackfeet Agency was established putting in place a continuous presence of the U.S. Government.

1855 – The Lame Bull Treaty (Blackfeet name)/ the Ft. Benton Treaty or Judith River Treaty (U.S. government name). This treaty took place at the mouth of the Judith River with the Blackfeet, Nez Perce, Salish and Pend d'Oreille (language in treaty also refers to Flathead tribe)

to make way for the railroad. The treaty basically sold the traditional southern Blackfeet lands as common hunting grounds for all Northern Rockies and Great Plains tribes for \$20,000/yr. worth of food and supplies. No Blackfeet ever saw a penny of this money as it was “managed” over a period of ten years by U.S. government officers.

1862 – The Homestead Act offered Native American lands free to any settler who made the required “improvements”.

1868 – The Ft. Laramie Treaty of 1868, unsigned by the Blackfeet, permanently erased 88% of their remaining territories in Montana. With their former territory all but gone, the Confederated Blackfoot tribes were forced onto reserves, three in Alberta and one reservation in the U.S. that included much of Glacier National Park.

1887 – The Dawes Act of 1887 purported to stimulate “assimilation of Indians into American society”. This legislation was again an Act of Congress, not a negotiated treaty. With the incorporation of the Dawes Act, land owned by America’s indigenous peoples decreased from the approximately 138 million acres existing in 1887, to less than 48 million acres nationwide (Gunn, 1997). The Dawes Act left over 90,000 American Indians landless, probably double to triple for this statistic because the U.S. government later only counted people who were over 20 years old and documented to be at least half Indian blood. Some assert that over two-thirds of all Native Americans became landless at that time, thanks to the devastating impact of the Dawes Act. The Dawes Act reflected the forced assimilation views of those who would reform Indian Policy. This act dissolved many tribes as legal entities, wiped out tribal ownership of land, and set up individual Indian family heads who were at least ½ documented Indian blood of one single tribe (not those who were 60/132’s Blackfeet and 6/132’s Cree) with 180 “free” acres. “If the Indians behaved themselves like ‘good white settlers’, they would get full title to their holdings, as well as citizenship in twenty-five years” (Bailey & Kennedy, 2008). This Act, like others, helped the U.S. Government circumvent the negotiations that were necessary in treaty making procedures.

1902 – Dead Indian Act. County officials informed elderly Blackfeet Indian people that they would have to sell their property in order to receive welfare entitlements. The county and BIA then looted the Individual Indian Money (IIM) accounts and forced the land sale of all deceased

Indian allottees' lands. This heinous landgrab was entitled Secretarial Sales of Deceased Indian Allotments, whereby the Secretary of the Interior sold the trust property of the deceased Blackfeet allottee to whites, without notification or authority of the heirs. There were over 500,000 acres of Deceased Blackfeet Allotments.

1906 – The Burke Act (also known as the Forced Fee Patenting Act) was designed to strengthen the U.S. Government's power beyond those stated in the Dawes Act.

1908 – The Curtis Act finalized the U.S. government control over American Indian people. It abolished all forms of tribal self-governance and eliminated tribal jurisdiction of all Indian lands. It made it illegal for them to follow their spiritual practice, wear their traditional garb and use their own language. Essentially, their former way of life was against the law.

1909 - Enlarged Homestead Act again allowed for settlers to gain ownership of more Native lands.

1910 - Glacier National Park was established, the eastern half of which belonged to the Pikuni. It ignored the "mountain top to mountain top" western boundary established by the Lame Bull Treaty. This legal issue has never been resolved.

1929 – Through Secretarial Sales of Deceased Indian Allotments and Secretarial Sales of Heirship Lands and by Forced Patents another 293,000 acres of remaining Blackfeet land was stolen and was legally placed in the hands of non-Indians by 1929 (Figure 2.3).

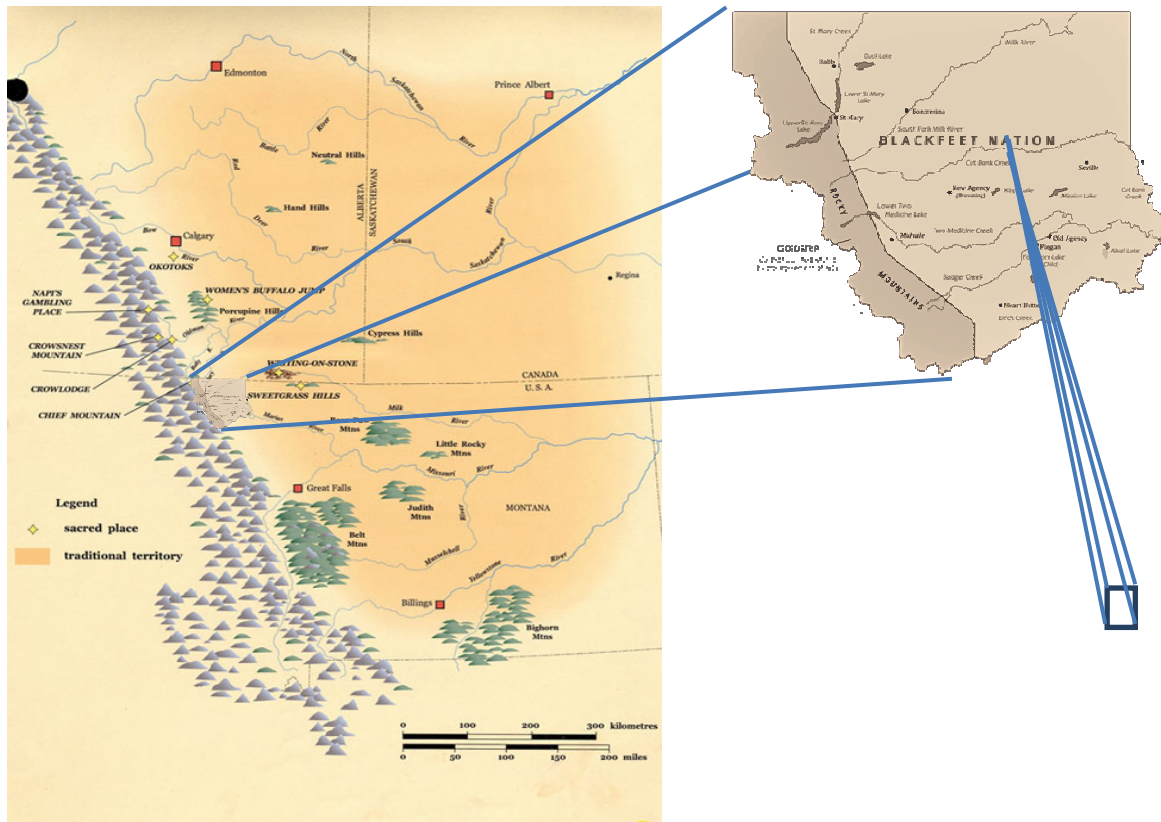


Figure 2.3: The evolution from millennia of traditional lands to living on an allotment.

1956 – Indian Relocation Act of 1956, or Public Law 959, was a United States law intended to encourage Native Americans in the United States to leave Indian reservations, acquire vocational skills, and assimilate into the general population. Part of the Indian Termination Policy of that era, it played a significant role in increasing the population of urban Indians and decreasing the number of enrolled tribal members of all tribes in succeeding decades (Jaimes, 1992). The upshot of this was that it severed claims to land ownership for those who were “relocated”.

Forced removal of children to boarding school:

U.S. Government policies towards America’s First People, Native Americans, were aimed from the beginning at a complete expunging of the Indian way of life and culture, thereby assimilating indigenous peoples into the new and developing American culture. As early as the start of the Nineteenth Century, George Washington and Henry Knox were already promoting the cultural

transformation of Native peoples (Perdue, 2003). This evolved into a “flawed morality of taking the land of indigenous people simply because the Europeans ‘discovered’ the land and wanted it” [<http://www.pbs.org/indiancountry/history/boarding.html>]. The land was easier to take if its residents were acculturated away from strong ties to their sense of place, their traditional practices and their extended family structure. Assimilation and acculturation policies that finally reached Blackfeet Country in the 1890s undeservedly overwhelmed a people weakened by foreign diseases, starvation, loss of buffalo and traditional hunting and gathering lands.

Assimilation was based on the euro-centrist assumption that European Americans were inherently superior to the original inhabitants of North America in all ways: intellectually, morally, culturally, linguistically, and territorially (Todorov, 1982). To aid in the assimilation and acculturation process, the Civilization Fund Act of 1819 was implemented. Its main provision was an annual annuity of ten thousand dollars to any school that was established to stimulate the "civilization process" (Prucha, 2000). The Bureau of Indian Affairs (BIA) was expressly created at this time (1824) to administer the Civilization Fund Act annuities to schools. While the passage of the Act led to policy shifts and treaties that ceded more land to the United States government (Jeynes, 2007), the most overt goal of The Civilization Fund Act was to "civilize" Native Americans by extermination of language, close familial ties, traditions and customs (Levy, 2009). This program of ethnocide insured that the upcoming generations of young Native American people, at least those who survived, did not so strongly identify with place and tribe. The removal of children against the will of their families and tribe, to schools that were hundreds or thousands of miles away, disconnected them from all that was familiar. Denigrated and inadequately fed, the indoctrination began.

The first off-reservation school was the Carlisle Indian Industrial School. U.S. Army officer Richard Henry Pratt founded the Carlisle Indian Industrial School in 1879 at a former military facility in Pennsylvania. Life at Carlisle was based on Pratt’s classical conditioning of Apache children separated from their parents and far removed from their homelands in Arizona to a Prisoner of War camp in Florida. Carlisle became the template for other off-reservation boarding schools established by the BIA.

Some of the policies required of Indian school administrators were draconian. For instance, they were told to withhold rations from parents who did not send their children to school (Rule 19) and to arrest and imprison anyone who interfered with their work (Rule 21). Pratt, in an 1892 speech (Henry, 2004):

“A great general has said that the only good Indian is a dead one. In a sense, I agree with the sentiment, but only in this: that all the Indian there is in the race should be dead. Kill the Indian in him and save the man.”

The effect of being torn a thousand miles away from family and home was psychologically and physically equivalent to being orphaned, a prisoner of war, in a now “foreign” country. Hundreds of thousands of American Indian children were forced by the US Government to attend schools where tribal languages and cultures were displaced by English and often a warped form of Christianity. By the early 1900s there were 460 boarding and day schools near reservations.

Though the heart-wrenching practice of child removals, which devastated Indian families and tribes, continued in many locations by law only through 1950 (conversation Edmund Augare July, 2012), the effects of this cultural genocide remain very pronounced within family units and tribal communities to this day. One need only think of generations of parents with empty homes and generations of children growing into adults within the unloving and regimented boarding schools. Consider how little attachment they could form within their first 5-6 younger years, as opposed to 12+ impressionable years in strict, military-like boarding schools. It is easy to understand that after four generations of minimal parenting and little cultural nurturing the resulting impacts could lead to preventable deaths from alcoholism, addiction, suicide, disease, poverty, and a continued loss of Native American identity.

Currently, the Bureau of Indian Education oversees a total of 183 elementary and secondary schools, both residential and peripheral dormitory styles, across 23 states (www.bia.edu/schools). Attendance at residential schools is no longer required by law. They survive because the goal is no longer cultural genocide, but to offer food, clothing and lodging to low income families.

The Bear River (Marias) Massacre

A heinous act on January 23rd, 1870, near present day Shelby, Montana led to the death of many innocent people. The defenseless camp dwellers - Blackfeet women, children and old men - were unarmed and said to be suffering from smallpox, still in their beds and trying to stay warm in the -40°F temperatures when a contingent of US Army cavalry attacked under false pretenses. The massacre is not well documented so there is some discrepancy in the exact number of casualties. The counts range from 173 in government reports to 217 in Indian scout accounts to more than 300 in survivor retellings, along with unaccountable deaths of those who might have escaped the massacre at camp but died of exposure.

A Heritage of Subjugation

Less than a hundred years elapsed between the Blackfeet's first encounters with French Canadian fur trappers around 1790 and the Old Agency starvation winter of 1883-4. During this period however, the Amskapi Pikuni, a flourishing community of seasonal hunter gatherers numbering about 7000 dwindled to a small band of 600 survivors. The Pikuni were the last tribe in North America to be rounded up and confined to a reservation. Their near demise was precipitated by exposure to new diseases, starvation through the government's systematic eradication of the buffalo, theft of their lands, forced removal of children during their formative years, and unjustified massacres. What followed were 50 more very tough years.

Ironically, tough times for the Blackfeet turned toward the better in the mid-1930s while the rest of the US was in the grips of the Great Depression. Essentially, the Blackfeet had been forced into a Great Depression lifestyle a half century earlier. In 1934 they were able to join in the New Deal recovery process. The Blackfeet participated in the Indian Division of the Civilian Conservation Corps (<http://www.manataka.org/page255.html>). Civilian Conservation Corps (CCC) Camps were eventually established in Glacier Park Divide (1933), Sherburne Lake (1934-7), Glacier Park (1934-7), Many Glacier (1935-7), Two Medicine (1935), Browning (1935), Birch Creek (1935) St. Mary (1938), and Babb (1935-8) [CCC@CCClegacy.org]. CCC teams

built the stone bridges for highways, rural roads and throughout Glacier National Park. They also built the St. Mary River Canal system. These CCC jobs were literally the first formal employment opportunities with paychecks in US dollars that Blackfeet people had ever experienced.

Through these jobs, the community was introduced to a completely different cultural model, based on money for labor in place of subsisting on the resources of their territorial lands (this new system has only been in place these past 81 years). No longer were activities conducted as a tribal unit. Families were dispersed across the landscape on the allotments that had been dictated by the Dawes Act rather than living in communal bands. During harsh winter conditions, this amounted to complete isolation. Survival now depended on self-reliance, with short season gardening, instead of the collective buffalo subsistence enjoyed by the tribe as a whole. Gardens used only the merest fraction of the land. The bulk of the land within the Reservation was managed by the Bureau of Indian Affairs and the Individual Indian Money accounts (IIM). The land allotment process had terminated, and there was no further systematic wholesale distribution of Amskapi Pikuni lands to non-Native people.

The IIM accounts were (and still are) an avenue through which the BIA could lease out the majority of the land within the reservation without the allotment homeowners permission, this power is exercised via the Department of Interior. The homeowner only had control of a 2.5-acre home site within their allotment. Because Native Americans were then (and still are) considered “wards” of the government, the BIA had control of the IIM money. (I personally am ward of the government #U10995). The Bureau of Indian Affairs has not managed the lands with a Blackfeet vision. They have retained an untold amount of the lease funds for “administration fees”. This continues today despite the U.S. Supreme Court decision on the Cobell vs. U.S. Department of Interior lawsuit which declared this practice egregious and unlawful.

With the national push for energy resources after World War II, it was not long before the USGS arrived in Amskapi Pikuni Country to characterize the subsurface geology. Through this exploration for petroleum, government personnel became aware that the geology was also suitable for accepting toxic waste for burial. It did not hurt that the site was remote and the political power to resist was minimal. The politics of Hanford Atomic Works encouraging the

Blackfeet to accept dangerous waste in exchange for minimal amounts of money, follows the course of the “not in my own backyard” philosophy that has predominated in Indian Country. This is evident within the Goshute tribe of Utah, and one of this country’s largest nuclear waste sites in Skull Valley near Salt Lake City. The next chapter will examine evidence regarding communications and proposals for radioactive, contaminated waste dumping on Blackfeet lands.

Chapter 3

Examination of the Historical Records and Sites for Evidence of Toxic Dumping

How does one go about exploring a topic where no previous research exists and the topic is nothing more than persistent rumors that have been passed around for at least two generations? There are no earlier papers to use for guidance. One has to visit potential sites that might house relevant documents and take advantage of current search technologies to see what may have been digitized elsewhere.

When I was growing up, the stories of toxic disposal always centered around “something bad” being buried up near the mountains. My great grandmother loved bear grass, and would often send one of her granddaughters out to pick for her, but she did not want us to go pick it up on Hudson Bay Divide because of the possible danger. Given that these stories were circulating as far back as the mid-sixties, I presumed that the dumping had to have taken place in the 1950’s. This predated the emergence of concern about the toxic nature of pesticides and chlorinated organics, which is generally attributed to the publication of Rachel Carson’s *Silent Spring* (1962). But it was clear from the Pikuni people relating these tales, that whatever was buried was “really bad”. By the time I was able to begin this project, many of the original participants who shared stories of possible dumping events were no longer alive. Mostly I had access to second-hand retellings.

As I listened to the stories over the decades prior to this investigation, I connected them with what seemed to be clusters of cancer among residents (Figure 3.1). The incidence of cancer seemed especially high among people living below Hudson Bay Divide (a ridge running parallel to Lower St. Mary Lake, from Divide Mountain to Duck Lake). Another cluster was located along Del Bonita Road (a ranching community that begins at U.S. Highway 2, approximately 14 miles east of Browning, Montana, and runs 30 miles due north to the Canadian border). Stories also mentioned the possibility of some form of contaminated waste being dumped near both Four Horn Lake (about half-way between Heart Butte and Old Agency), Kiowa Camp (14 miles west of Browning, Montana, on U.S. Highway 89), and Boulder Ridge (north end of Lower St. Mary Lake).



Figure 3.1. The Blackfoot Reservation locations associated with dumping stories. 1. Hudson Bay Divide. 2. Del Bonita Radar Station. 3. Four Horn Lake. 4. Kiowa Camp 5. Boulder Ridge. (Basemap from http://www.blackfeet.enrollment.org/images/blackfeet_reservation2.png)

Since cancer to me was most strongly associated with exposure to radiation, I gravitated towards thinking the toxic dumping might involve radioactive wastes. The most obvious candidate for radioactive waste, by proximity, was the Hanford Works near the Tri-City region of eastern Washington. So that is where I started. Hanford had been built by the Army Corps of Engineers and operated under contract by the DuPont Corporation during World War II (Gerber, 1992).

Formally established in 1943, Hanford began its existence as an important component of the Manhattan Project, a research and development program dedicated to the production of nuclear weapons for WWII Allied Forces. Hanford activities were led by the United States with significant international participation from the United Kingdom, Canada and nuclear scientists who had fled to the West from the Nazi regime.

Hanford's role in the Manhattan Project was to produce sufficient quantities of fissionable material to construct weapons. The first full-scale plutonium production reactor in the world was constructed at Hanford. The Hanford site still represents two-thirds of the nation's high-level radioactive waste by volume (Harden & Morgan, 2007). Hanford is currently the most contaminated nuclear site in the United States (Schneider, 1989 & Dininny, 2007).

Initial Hanford Site Document Searches

In searching for any direct ties between Hanford and the Blackfeet Nation, I probed the official Hanford website (<http://www.hanford.gov>), The Hanford Technical Library (<https://spcollab.pnnl.gov/sites/library/Pages/Home.aspx>) and The Department of Energy (DOE) Public Reading Room (doe.reading.room@pnl.gov). The Hanford Technical Library and the Department of Energy Public Reading Room are co-located in the Consolidated Information Center of the Washington State University's Max E. Benitz Memorial Library/Tri-Cities Branch Campus. The DOE collection alone contains over 49,000 items, although most of these are not yet digitized. The DOE does not allow for circulation of these documents, therefore, nothing can be checked out of the library nor is interlibrary loan allowed. The collection is predominantly technical and administrative reports created by DOE and its contractors from the 1943 origin of the Hanford Site to present, but contains only those that are declassified and publicly available.

Because my initial searches through all available databases at the Benitz Library were fruitless, irrespective of what search words I entered, I questioned my ability to pose a viable search. I contacted the librarians in charge of each of the document collections hoping that their expertise might afford information that I was unable to attain. They were no more successful than I had been. At this point I began to think it too far-fetched that Hanford managers would go to the trouble of transporting hazardous waste all the way to Montana given how poor the roads were at that time. I-90 north of Hanford was not completed to the Idaho border until 1968, and not finished through Montana until the mid 1980's (Johnson, 1990, revised 2006). Most of the town of Browning did not even have paved roads as late as 2002. I did not believe that the railroad would transport such dangerous waste, given frequent derailments through the mountains. Most

significantly in my mind, there were other tribal lands much closer to Hanford, if indeed the government had really intended to foist such dangerous waste products on Indian lands (e.g., the Colville Reservation, the Yakima Reservation, the Spokane Reservation, the Umatilla Reservation and the Warm Springs Reservation).

Serendipitously, after learning more about the operation of the facility and potential sources of radioactive waste, I chose to investigate the 200 West Area of the Hanford Site anyway (Figure 3.2).

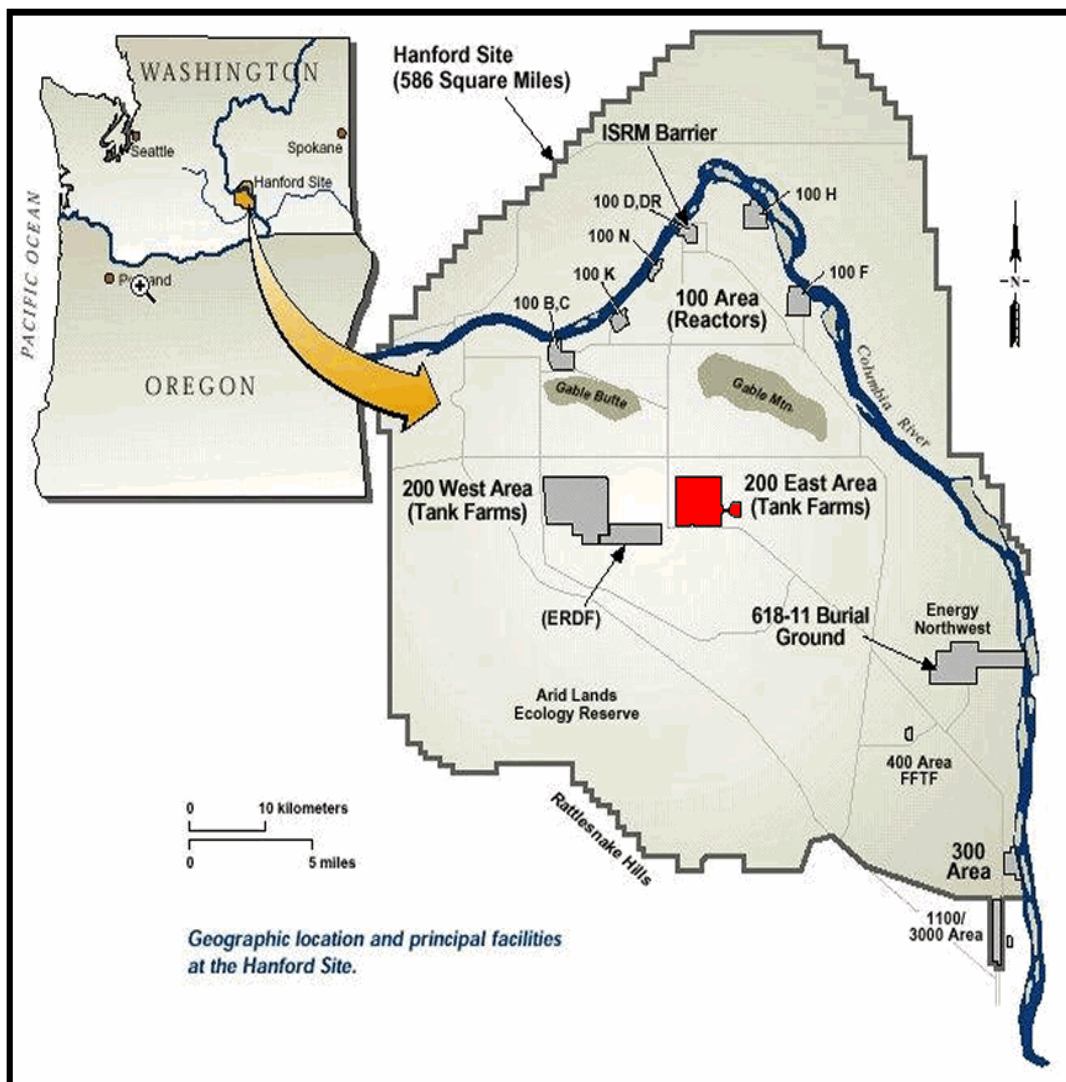


Fig. 3.2 Map of location within the Hanford Works. Site map includes 200 West Area. (Retrieved from <http://navy.memorieshop.com/Subs/Tunny/Tunny-Reactor.html> 4/26/13)

The primary function of facilities at the 200 West Area (75 square miles in extent) was extraction of plutonium that had been bred from the uranium fuel rods in the 100 Area reactors (www.hanford.gov/page.cfm/200Area). The process units were five mammoth concrete “canyons” that were about 1000 feet long and 100 feet deep. The walls towered sixty feet above ground and penetrated 40 feet below (Figure 3.3).

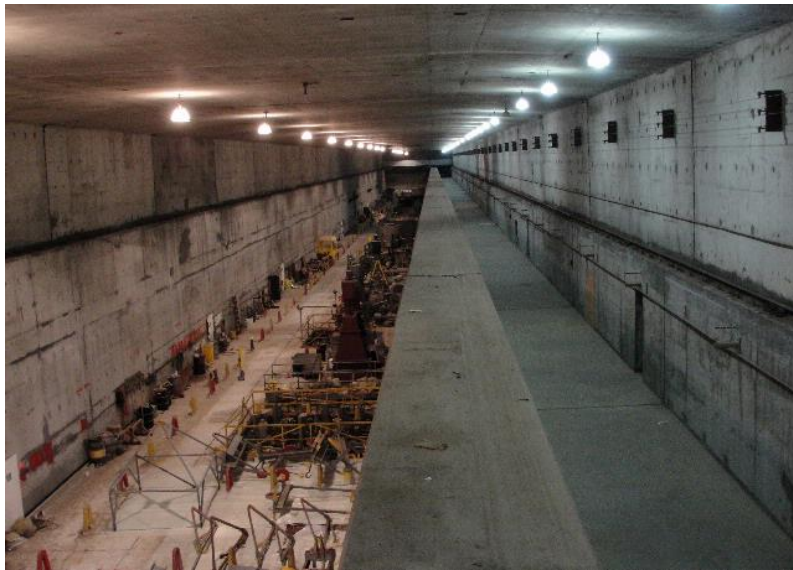


Figure 3.3. Upper Panel: Area 200 West U Canyon Interior view. Lower Panel: Truck removing a waste tank from the exterior of U Canyon. (Retrieved from <http://www.hanford.gov/c.cfm/photogallery/imgView.cfm/Recovery/CHPRC-0900540.10%20Attachment%201%20Photo%2013%20U%20Plant%20Canyon%20with%20equipment%20on%20deck.JPG> on 4/26/13).

An important part of the plutonium production was the management of the waste generated by the removal process. This amounted to billions of gallons of liquid. Waste tanks were present in this part of the Hanford site in 1961 (Figure 3.4). While some low level wastes were infiltrated into the local subsurface, the most hazardous chemical and nuclear waste was sequestered in 177 underground storage tanks distributed among 18 tank farm locations. The storage tanks ranged from 50,000 gallons to more than a 1,000,000 gallon capacity. Currently some 53,000,000 gallons of chemical and nuclear waste still remain in storage in the 200 West Area tanks, at Hanford (<http://www.hanford.gov/page.cfm/200Area>).



Fig. 3.4. An older tank farm in the 200 West Area. (Retrieved from <http://www.hanford.gov/c.cfm/photogallery/imgView.cfm/Recovery/CHPRC-0900540.10%20Attachment%201%20Photo%2013%20U%20Plant%20Canyon%20with%20equipment%20on%20deck.JPG> accessed 4/27/13).

Because of this, I hoped that documents pertaining to Area 200 might divulge a connection between Blackfeet Country and Hanford. By manually searching Area 200 documents I opportunely found a set of Department of Defense agency photographs of a boxcar originating in Hanford Area 200 that had derailed and tipped over in Montana (two of these appear as Figure 3.5). When thinking of derailments in Montana, both wind and winter conditions are the

precursor. Both of these conditions exist between West Glacier and Browning. Derailments occur often in this section. Unfortunately, no details accompanied the photos other than the date, 5/14/56, and a comment that “it had been cleaned”. It is unknown whether it was the car or also the surrounding accident site that had been remediated. The date made it within the initial parameters of my research.



Figure 3.5. Interior shots of both ends of the Area 200 boxcar that derailed in Montana. Note in the right-hand photo evidence of the car being on its side exists in the deformed ceiling supports (from www.hanford.gov).

The Del Bonita Radar Site

Since the Hanford Site document collection was unfruitful as a source for the toxic materials linked to the Blackfeet Nation, I returned to stories that related “something bad” to health problems at Four Horn Lake, Del Bonita Road, Kiowa Camp and Hudson Bay Divide. Edmund “Wishy” Augare, my uncle and a member of the Blackfeet Honorary Council, reminded me that cancer and death were a real part of our communities in Pikuni Country. He reminded me of our Medicine Wheel, and the balance that is so important. It is a full circle, from east back to east again, and perhaps what was needed was a different starting point. He suggested that I focus on what might be teased out of re-examining the perceived disease cluster locations, instead of potential sources of toxic agents that might cause the disease.

Del Bonita Road was another area that might be suspect for a cancer cluster. My uncle talked about the U.S. Air Force conducting powder bomb trials parallel to the Canadian border, at the north end of Del Bonita Road during the 1950s and 60s. Planes for these exercises would have flown out of Great Falls about 123 air miles to the southeast. The smoke was used as a visual marker to assess where munitions impacted without actually having an explosive charge that would cover the landscape with impact craters or cause injuries to people or livestock. Red smoke from the detonations blew all the way to Two Medicine River, 20 miles to the south. This area is now known as “Red Buttes” because of that activity.

A common recipe for red smoke that might have been used in this application is potassium chlorate, lactose and the red dye, *para*-nitroaniline (Figure 3.6). The potassium chlorate (KClO_3) is a strong oxidant that will react with the lactose sugar fuel. A product of the combustion that ensues is K_2CO_3 (potassium carbonate) which is a fine white particulate that constitutes the smoke. The *para*-nitroaniline is attached to the smoke particles in the process giving rise to its red color.

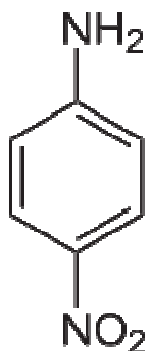


Figure 3.6. The structure of *para*-nitroaniline

Unfortunately, *para*-nitroaniline is toxic by way of inhalation, ingestion, and absorption. Its LD_{50} (the lethal dose for half the test population) in rats is 750 mg/kg when administered orally (CDC, 2013). *p*-Nitroaniline is particularly harmful to all aquatic organisms and can cause long-term damage to the environment if released as a pollutant. The national Centers for Disease Control and Prevention lists oral toxicities for animal studies, but has no data regarding problematic inhalation doses for humans. Its effects on humans are based by analogy to aniline, a possible breakdown product that is extremely toxic (<http://www.cdc.gov/niosh/idlh/100016>).

HTML accessed 3/11/13). The main effect of aniline by any route of exposure is a blood disorder in which oxygen delivery to the tissues is impaired. This may have mild to severe consequences depending on the duration and amount of exposure. Acute exposure to high amounts of aniline may lead to coma and death. Aniline has been classified as very toxic to humans with an LD₅₀ at 50-500 mg/kg (U.S. Dept. of Health and Human Services Hazardous substances Databank, HSDB online database, National Library of Medicine, Bethesda, MD, 1993). Aniline has been found in at least 59 of the 1,585 National Priorities List sites identified by the Environmental Protection Agency (EPA) (<http://www.atsdr.cdc.gov/toxfaqs/tfacts171.pdf> accessed 3/11/13).

Shortly after Uncle Wishy's comments, Ray Harwood Sr., my father-in-law, called to say his leukemia had returned. He grew up on his parents' ranch with two brothers along Del Bonita Road, about a mile south of the area where the smoke bombs were dropped. Both his mother (from South Dakota) and father succumbed to leukemia in 1983 and 1989, respectively. His younger brother and his younger brother's wife had earlier taken over responsibilities of the ranch. They, too, both died from cancer, Robert Jr. from Hodgkins lymphoma in 1990 and wife Theresa Deeds Salois in 1993. Deeds also had repeated late-term miscarriages while she was in her child-bearing years. Their youngest son also developed leukemia. Only one member of the family that lived on the site, Danny Harwood, has escaped cancer although he did contract some sort of blood disorder. Another man that ranched close to there, Joe Kipp, also died from cancer. So I began a series of attempts to learn as much as I could about the Del Bonita Road area and an de-commissioned Air Force radar site located there.

Surprisingly, Air Force personnel at Malmstrom Air Force Base in Great Falls were not able to supply any information about Del Bonita. I called the main switchboard at Malmstrom and was immediately routed to their Freedom of Information Acts (FOIA) officer. She said any information that I wanted would only be released if I filed an official FOIA application. I explained that I did not have any specific information to request, but generally wanted to know if there were any interactions between the Air Force and the Blackfeet tribe in the 1950s time period. I was then given the opportunity to speak to the FOIA officer's assistant, who shared three phone contacts. Two were not able to assist. The third was the Malmstrom Air Force Base Museum Curator. He assured me that there had been no activity between the Blackfeet and

Malmstrom in the 50s, as Malmstrom had not even come into being until 1957. Furthermore, he believed there was no record of any interaction with the “Blackfeet Reservation” in the history of Malmstrom AFB. He was very gracious, although I questioned him repeatedly, citing the Air Force Camp (vacation lease by the Air Force on lower St. Mary’s Lake within Blackfeet lands) and the radar station on Del Bonita Road, along with a site north of Browning known as “Gobbler’s Knob” (also within Blackfeet lands). He was unaware of these sites, but assured me that he would enjoy doing a little research and that I was welcome to call him back within a week’s time. At this time he still had nothing to report.

The Air Force was not forthcoming with any information about the radar site, but I was able to find some historic photos and news stories from the Cut Bank Pioneer Press and a veteran’s group, the Association of Radar Workers www.radomes.org. (Appendix III).

I looked through records of Malmstrom Air Force Base and old radar sites trying to note any incidence of cancer within the Air Force population whose duty station was this specific radar site. I was rather surprised that “official” Air Force channels were so oblivious of their own history. For example, Malmstrom Air Force Base was simply an update in names. It began during World War II at a location 6 miles northeast of Great Falls as part of the Army Air Corps (the original name of the U.S. Air Force) and was known as East Base. Later, this evolved to Great Falls Army Air Base. The base was used as a stepping stone in the Northwest Staging Route of the Lend-Lease Act, a 1941 program to promote defense of the U.S prior to Pearl Harbor (Public Law 77–11, H.R. 1776, 55 Statute 3034, enacted March 11, 1941). Through this mechanism, aircraft and supplies were ferried to Soviet allies during the war against Nazi Germany. Planes would move through Great Falls to Ladd Field in Fairbanks, AK and then over the North Pole to the U.S.S.R. A total of 1,717,712 pounds of aircraft parts, tools, explosives, medical supplies and miscellaneous equipment, were shipped through Great Falls Army Air Base to the Soviet Union. Also included were significant technology transfers -- plans for the atomic bomb, hundreds of tons of materials for nuclear weapons, strategic intelligence reports, and the plans for the most advanced aviation, electronic, and heavy industrial technology traveled through Great Falls in sealed diplomatic containers. The “pipeline” worked in both directions. Dozens of Soviet agents entered the U.S. through Great Falls. After WWII, the base became mostly involved in maintenance of intercontinental ballistic missiles that were dispersed across

the landscape in well-separated sites. Montana launch sites were suitable given the range of the Minuteman I missiles that were housed in silos. Later silos were outfitted with Minuteman II missiles that had a longer range.

After numerous attempts to receive information from Malmstrom AFB officials, I began another avenue of research via newspapers, libraries and online media. I found that the more recent Cut Bank Radar Station, of the same location, was a renaming of what had originally been the Del Bonita Radar Station.

Besides the bombing tests that took place there, the Air Force built an air defense radar station on the south side of the Milk River just west of Del Bonita Road. This radar site was operated by the 681st Aircraft Control and Warning (AC&W) Squadron, Air Defense Command between March 1951 and June 1965 (<http://wikimapia.org/1562113/Cut-Bank-Air-Force-Station> accessed 11/2/11). Because the Del Bonita site was active during was 1960's, after Malmstrom Air Force Base was renamed, it seems that the museum curator would be aware of active USAF sites in the vicinity. It is true, however, that Malmstrom was primarily a Strategic Air Command base as opposed the radar site's Air Defense Command oversight.

Conversations with Tribal Members

Because neither Hanford nor the Air Force were forthcoming with documents regarding toxic dumping, I began interviewing tribal elders who might have had some firsthand experience with any historical disposal events. Wilbert Fish, the traditional tribal herbologist mentioned in the opening chapter, conducted some of his own investigations in the early 1990s.

Worried about the high cancer incidence below Hudson Bay-Divide ridge, he convinced EPA to conduct a round of water sampling in 1992. Although he could not remember the specific chemicals that were analyzed, he recalled that several carcinogenic agents exceeded safe levels for routine human consumption. The results from the analyses remained with Fish until the Blackfeet tribal EPA officer expressed an interest in it. Fish handed over a full box of information and analytical reports for the officer to review. When no action followed, he asked for the materials to be returned. The EPA officer claimed he no longer had them in the office.

Fish also arranged to videotape the sites that he was investigating. He engaged the assistance of Rosie Mancha, the only person he knew who owned a video camera in 1992 (Fish, 2011). Together they went to the Del Bonita Radar site to gather film records. Fish stated, “It looked like they’d left everything – dishes and forks on tables in barracks and we filmed it all...It looked like [there were] water cooling pipes running up and down one of the buildings.” It appeared to Fish that the site had been precipitously abandoned. It made him concerned that there might have been a spill accident of some sort. Based on these fears, he requested EPA to investigate the former radar site. EPA investigation turns up nothing more than contamination from several underground storage tanks which probably contained fuel, lubricants or solvents. EPA must have found some clean-up issues that required attention because Fish reported that almost immediately the Del Bonita site was “bulldozed – leveled”. Yet to be determined is who performed the clean-up. Was it EPA who contracted to have the work done or did they force the US Air Force to remediate their own mess?

A serendipitous interview with another tribal member arose out of simply greeting a former neighbor, Joe Bremner. He asked what I was up to and upon hearing about my thesis project said, “You need to talk to Rose [his wife]”. Rose Bull Shoe Bremner recalled memories of puzzling events from her childhood. She spent a considerable time on her grandparent’s ranch near Four Horn Lake (also known as Owl Child Lake). “The craziest thing happened when I was a child. One evening, men in military uniforms came to the door of my grampa’s, way out in the country, asking for directions. Later, as I lay in bed, I remember watching truck lights in the distance, going back and forth, until I fell asleep.” She shared that this was very unusual at her grandfather’s ranch, as it was very far out in the country and she had rarely seen a single set of headlights, much less the activity that she had witnessed that night.

Sister Providencia Tolan Papers

My most significant break-through with regard to historical documents came as a result of another “catching up” visit. Early in 2011 I was visiting with John Wagner, a Blackfeet tribal member who lives in Missoula and is also a University of Montana graduate student. Eventually, the conversation turned to my thesis project. A few days later he sent me an email

with the message, “You have to look at the Guide to the Sister Providencia Tolan Papers.” He was conducting investigative research for a film on the Bear River Massacre and happened across them within an online collection from the Northwest Museum of Arts and Culture in Spokane, WA. I accessed the online catalog at the Northwest Digital Archives website, a service used by many universities and museums throughout the northwest (<http://nwda.orbiscascade.org/ark:/80444/xv56027>). I found a listing of the documents that comprise the Sister Providencia documents. Of the 11 boxes within the collection Box 1 Folder 29 was labeled “Atomic Waste Disposal Proposal for the Blackfeet Reservation” and dated July 19, 1961. It was surreal to see the words “atomic waste disposal” and “Blackfeet” linked in a single title. I assumed that the stories I had heard as a child through our oral tradition were about business that was conducted as a covert operation. But here it was in plain black and white print. I tried numerous ways to get the folder open and view its contents remotely, but only the folder titles had been digitized. I called Jane Davey, the archivist at the Joel E. Ferris Research Library and Archives, on April 22, 2011 to find out how to access the Sister Providencia documents. She indicated that the folder in question held six pages that she could copy and mail to me.

Within the contents of the Sister Providencia file from the museum, was a six-page proposal from the Petroleum Research Corporation (PRC) titled “FOR THE STORAGE OF BY-PRODUCTS UNDER THE BLACKFEET INDIAN RESERVATION” (“from the Hanford Atomic Products Operation at Richland, Washington”). The mission of the proposal was to bury radioactive waste from then named Hanford Atomic Products Operation, “under the Blackfeet Reservation” (See Appendix I). It was dated July 19, 1961. The PRC proposal immediately prompted me to plan two new actions: 1) I felt compelled to visit the museum in Spokane to view firsthand the remaining documents in the Sister Providencia Tolan collection; and 2) I needed to travel to Browning to gain access to tribal archives from 1961 in order to uncover the outcome of the proposal.

In May, 2011, I made an appointment to visit the Joel E. Ferris Research Library in Spokane. I supplied the archivist with a list of folder numbers from the online catalog for retrieval. Some folder numbers actually turned out to be as many as three to four large cardboard document boxes. I was free to photocopy or photograph any documents that I wanted.

As I poured over the document collection, I learned that Sister Providencia was a professor of sociology at the Catholic-founded College of Great Falls, from 1941-1974. While teaching sociology was her livelihood, her passion was as an irrepressible advocate and lobbyist for community indifference towards dislocated Native Americans. During the late 1920s, Great Falls city officials had ordered the burning of Indian camps along the Missouri River. Whether they were camped outside of the city along the Missouri, or at an area on the river which ran right through the heart of the business district, is unclear. Either way, it was despicable treatment of the people and families, whose land the city official's feet walked on. The residents fled to Hill 57 on the northern edge of Great Falls. There, their slum-like shelters surrounded the city dump where the residents could forage among the city's discarded food and household items for their survival. Sister Providencia fought the city, the county, the state and Washington, D.C. to meet basic needs for these people. She was also an advocate for the "Hill 57 Indians" within the seven tribes that were native to Montana. She appeared before tribal councils throughout the state in an effort to acquire assistance for the landless people of Hill 57. Because of their assistance and concern for the landless people in Great Falls, and because of the friendships gained by Sister Providencia (with the tribes), she accumulated a vast collection of tribal documents and legal proceedings involving all seven recognized Montana tribes. She also had a collection of documents from smaller tribes who were left landless by the arbitrary action of the United States government. Many Hill 57 residents were left completely outside of the allotment process and had no other place to subsist.

Because Sister Providencia could not attend every council meeting of every Montana tribe each month, she had a standing request for copies of all general council meetings and potential agreements being considered by tribes, to be mailed to her in Great Falls. This allowed her to keep current on any precedence-setting actions that could be applied elsewhere. Through this practice, she received a copy of the Petroleum Research Corporation proposal that was made to the Blackfeet tribal council in 1961.

Since Sister Providencia also got copies of the Blackfeet general council meetings, I immediately went to her collection to see what the tribe's disposition on the proposal had been. She had accumulated minutes from 1950 through 1970. These were contained in Box 2, Folders 14-37 and were labeled "Blackfeet Tribal Business Council minutes" or "Blackfeet Tribal Council

minutes” depending on the year. “Business” was dropped from the council name in July of 1957 and restored in 1967. Council minutes were intact up through February 1961 but then, maddeningly, there was a six month gap. Minutes after August 1961 were once again complete. I did find an item of interest at the end of the minutes following the gap. It mentioned that Old Fish Robe, a tribal elder, stood up pounding his staff. He remarked that his English was not good but his grandson’s was. He thought they were supposed to be there to discuss the waste burial proposal. Since all of Sister Providencia’s other records were so well organized and meticulously complete, this suggests that the minutes were never finalized at the time of the meetings for whatever reason.

Re-examining Council Documents at Tribal Headquarters in Browning

Because Sister Providencia’s tribal council minutes were missing a critical gap, I needed to return to Blackfeet Tribal Headquarters in Browning, to check on council records. The additional months that were present held no mention of the proposal.

The only surviving mention of a tribal debate, within both the Sister Providencia Tolan files and the BTBC minutes, on the contaminated waste burial proposal is the comment from Old Fish Robe noted above. That comment, interestingly, was on the back side of a page. If there ever was a deliberate, systematic attempt to remove all references to the proposal, the parties responsible must have missed this.

Examining Documents in the Mike Mansfield Papers

During the fall semester of 2012, I became aware that Mike Mansfield accumulated a sizable number of historic documents that might assist my investigation. Mansfield was a Butte miner who served in the U.S. House of Representatives from 1943-1952, as a U.S. Senator from 1953-1977, and as U.S. Ambassador to Japan from 1977-1988. The Maureen and Mike Mansfield Library on The University of Montana campus is the official repository of his congressional and unofficial ambassadorial papers (www.lib.umt.edu/asc/materials/areas/montana-politics-and-politicians). This massive collection contains 2450 linear feet of documents, 7500 photographs, 322 scrapbooks, 132 films and videos, and 600 art objects. While in the Senate and as Senate

majority leader for many years, he received thousands of documents that involved federal facilities and Native American issues. Upon investigation and learning what the Mansfield Collection entailed, it was then no surprise to find that his papers included a copy the PRC proposal (series 10-133E/3 accessed at nwda.orbiscascade.org/ark:/80444/xv87911 indexed as Series X: Senate: Federal Agencies, 1953-1977 Department of Interior: Bureau of Indian Affairs: Blackfeet: Atomic Waste Storage). It was a surprise however, that further confirmation of the connection between radioactive waste dumping and the Blackfeet tribe, had virtually been “under my nose” all along.

As a person with political power, Senator Mike Mansfield often received public opinion about what stance he should take in certain cases. The PRC proposal to the Blackfeet tribe was no exception. There were numerous telegrams that offered comments on the PRC proposal. Most of them were in opposition. Most intriguing of all was a comment from an accountant in Butte. He mentioned that the Blackfeet had the “gumption” to turn down the PRC proposal but, ironically, a white man named Hugh Black had contracted to accept atomic waste for disposal on land that he held within the Blackfeet Reservation boundaries (Appendix II).

A Re-Examination of Hanford Documents for PRC Information

Using the new information per the Petroleum Research Corporation’s proposal to the Blackfeet Tribe (dated July 19, 1961) I returned to a re-investigation of the Hanford Technical Library database and Hanford Declassified Document Retrieval System (<http://www2.hanford.gov/declass/>). My initial search had been cutoff at 1960. New keyword searches included Petroleum Research Corporation, PRC, Blackfeet, Blackfoot and Montana. All keywords, except “Montana” had no results. This time, the “Montana” keyword search responded with 19 links to documents. Ten of these results referred to research titled “Geology & Tectonic History of Hanford & Relation to History of Washington State and Active Seismic Zones in Washington & Montana”. The remaining declassified articles were referencing the “Boxcar involved in Montana Wreck” that was previously described. It is interesting to note that no record of the PRC proposal exists on documents that are available to the general public.

Chapter 4

What Would It Take to Perform a Cancer Cluster Investigation Regarding Blackfeet Country Toxic Disposals?

Part of what prompted this thesis investigation was a perceived high incidence of cancer in certain parts of Blackfeet Country. This chapter examines the resources and study design that would be necessary to prove that a cancer cluster exists. It begins by briefly describing what cancer is. It then outlines what a defensible identification of a cancer cluster would require. This is a challenging assignment. Four out of five cluster investigations are inconclusive, even with the vast investigative resources our governmental agencies have to offer -- NIH, CDC, EPA, DHHS -- even when a likely source is at hand. As an example of the challenges presented in such an exercise, two often cited cluster investigations will be briefly summarized: Fallon, Nevada and Sierra Vista, Arizona. Both investigations remain in limbo with no single quantifiable, defensible result being reached for either.

Cancer

Because of the complex characteristics of cancer, there are intrinsic challenges in identifying, interpreting and addressing cancer clusters. With very rare exceptions, cancer is caused by a combination of factors (NIH, 2013). These factors can be both externally and internally related. External factors that are known causative agents of cancer include chemicals such as asbestos, arsenic, benzene, beryllium and vinyl chloride (ATSDR, 2013), tobacco, infectious organisms such as hepatitis B, human papilloma virus, human immunodeficiency virus, helicobacter pylori (Mayo, 2013), radon (EPA, 2013), and radiation (EPA, 2013). Internal causative factors may be inherited mutations, hormones, immune conditions, mutations that occur from metabolism and chronic inflammation caused by any of the above (NCBI, 2013). Certain racial and ethnic groups experience more significant rates of cancer and cancer mortality than others. This can be due to genetic factors or numerous compounding factors. Research in this area continues to reveal issues such as more frequent late-stage diagnosis, barriers to adequate health care, health behaviors, biologic and genetic differences, history of other disease processes, and other risk factors (NIH, 2013). Some cancers are completely preventable, such as those that are a result of self-imposed environmental exposures such as tobacco use, UV over-exposure, and the overuse

of alcohol (liver cancer) and/or drugs (hepatitis C-related liver cancer, HIV related cancers). Any combination of the above factors can act together or in sequence to initiate or promote the development of cancer, making it extremely difficult to trace back to a single event or exposure. Nor can environmental exposures or single lifestyle events explain all cancers.

The American Cancer Society notes that over seventeen million cases of cancer have been diagnosed since 1990 however, because of an ever increasing rise in cancer incidence, there were 1.6 million known cases of cancer in America in 2012 alone. As of 2013, cancer is the second most deadly medical condition in America and affects one out of two men and one out of three women (CDC, 2013). Cancers that are preventable were associated with 577,190 cancer deaths in 2012 (CDC, 2013). Additionally, current science is revealing that approximately one third of preventable cancer deaths in 2012 were related to poor nutrition, physical inactivity or obesity (American Cancer Society, 2013). Because cancer causes about one out of every five deaths, it can be common for several people in a relatively small area to develop cancer around the same time, especially if there are a significant number of older adults.

When investigating a suspected cancer cluster, it is best to begin with what is known about cancer. "Cancer" is a term for over 100 different but related diseases (NIH, 2013). It is classified by site (organ system or area of body involved) and histology (cell behavior and type of cells affected) (DPHHS, 2013). Many factors must interact for cancer to develop. The trait that ties these diseases together is the uncharacteristic, uncontrolled growth, division and disbursement of cancer cells to any location in the body. Multiple mutations of genetic material within a cell, transforming normal cells into cancer cells (carcinogenesis), can produce aberrant growth and function. Cellular DNA contains a specific set of instructions that direct the cell, telling it how to grow and divide. Mutations within the DNA can order a cell to behave in ways that result in cancer. When a mutation within DNA instructs a healthy cell to grow more rapidly than normal, producing many new cells, this same mutation is then passed on to all of these new cells causing exponential cell growth and division. Also, mutations in DNA can cause genes to not perform correctly. Healthy cells contain genes for tumor suppression. These genes generate molecules that can recognize atypical growth and take actions to stop it. However, if a mutation happens within a tumor suppressor gene, it can either disable the gene, making it less effective or

deactivate it altogether (Mayo, 2013). Healthy cells also contain DNA repair genes. If a mutation occurs within a DNA repair gene, mutations that would otherwise be fixed may lead to cancer (NCI, 2013).

Researchers agree that with almost every form of cancer, other than some blood cancers, more than one gene mutation is required to compel growth. Although each type of cancer “has certain known and/or suspected risk factors associated with it” (NIH, 2013), it is not known exactly how many mutations per specific type of cancer are required. It is known that the mutations a person is born with act together with mutations a person newly acquires to cause cancer. The “born with” mutation only begins the cancer process, but does not assure that you will get cancer. This inherited gene mutation makes you more predisposed than other people to develop cancer when exposed to cancer causing agents. Fortunately, our body possesses an extraordinary ability to repair, and continue to repair, cellular mutations.

Most cancers progress over many years, even decades. This phase of time is known as the “latency period” (DPHHS, 2013). Because of the latency period it is easy to understand why the majority of cancers are diagnosed later in life (NIH, 2013). With increasing life expectancy there is a larger elderly population and, therefore, the probability for a continuing rise in cancer rates.

Requirements for Identifying a Cancer Cluster

Within sparsely populated Montana counties, only two or three cancer diagnoses might prompt community members to suspect the existence of a cancer cluster when in fact there is none. While it may seem like there are many cases of cancer in a local area, the evidence that must be gathered to confirm a cancer cluster is a difficult task. Since the purpose of a cluster investigation is the assignment of a causal source, the only types of cancer that count in an investigation are primary cancers that can be attributed to a specific type of exposure and that target the same organ or tissue systems in an individual. Once a cancer has metastasized, for example, it can no longer be associated with its original causal source. The incidence of cancer in the cluster must be statistically higher than that in a comparable population. Also, great care must be taken when drawing the geographic boundaries for the cluster location. Improper

boundary selection can falsely bias a cluster depending on the desired finding. Additionally, it is extremely difficult to avoid influences from differences in health practices (e.g., smoking, diet, fitness), differences in genetics, differences in age, and differences in occupational exposures, to name a few. Because of diverse latency periods in the onset of cancer for a given individual, not all cases may be expressed at the same time, if at all.

According to the United States Center for Disease Control and Prevention (2013), a case is not considered a “cancer suspect cluster” until the following parameters have been demonstrated:

“A Greater Than Expected Number: A greater than expected number is when the observed number of cases is higher than one would typically observe in a similar setting (in a group with similar population, age, race, or gender). This may involve comparison with rates for comparable groups of people over a much larger geographic area – e.g., an entire state.

A Greater Than Expected Number:

1. *Of cancer cases:*

All of the cases must involve the same type of cancer, or types of cancer scientifically proven to have the same cause.

2. *That occurs within a group of people:*

The population in which the cancers are occurring is carefully defined by factors such as race/ethnicity, age, and gender, for purposes of calculating cancer rates.

3. *In a geographic area:*

Both the number of cancer cases included in the cluster and calculation of the expected number of cases can depend on how we define the geographic area where the cluster occurred. The boundaries must be defined carefully. It is possible to “create” or “obscure” a cluster by selection of a specific area.

4. *Over a period of time:*

The number of cases included in the cluster – and calculation of the expected number of cases – will depend on how we define the time period over which the cases occurred.”

If an investigation seems to be gathering more and more credence, the epidemiologist will create a case definition and systematically assemble information that delineates the time period of concern, looking also at incidence before and after a suspected hazard was introduced into the environment, the geographic location under consideration, the causative agent and its mode of carcinogenic expression. The more precise a case definition is, the greater the possibility of discovering a risk factor because the case definition focuses attention on a single disease process that might arise from a specific exposure (Aldrich, 2002).

In Montana, the epidemiologist will need to consult the Montana Central Tumor Registry to help qualify the findings. Because case numbers are so small in Montana, using multiple year average incidence rates affords the ability to determine if higher cancer rates exist in a smaller community *vs.* a larger one. Extension of the investigation to regional or national databases will probably become necessary. Eventually, the investigator must prove that the number of cases of the primary cancer is statistically higher than that found in a population with a similar distribution of ages, genders and ethnic origins at a 5% probability.

Who investigates cancer clusters, and how?

People concerned about a possible cancer cluster can report it to a local or state health department. A systematic approach to answering inquiries concerning possible cancer cluster activity in either residential or community settings, has been established (CDC, 2013) and although procedures may vary nominally by state, most health departments will first ask for the following information:

- 1) The type(s) and number of cancers involved
- 2) Any suspected exposure(s) that might cause cancer
- 3) The area and time period in which the cases occurred
- 4) Specific information about each person thought to be affected
- 5) Specific information about the cancers themselves

Upon completion of initial investigations, as many as four out of five suspected clusters are determined to not be true cancer clusters (CDC, 2013). Because suspected cancer clusters warrant a great deal of concern in a community, it is important for all agencies involved to keep

the public informed throughout even the initial stages of an investigation so as to alleviate any fear or confusion caused by lack of knowledge. Because community or residential members might not be familiar with scientific research procedures, agency representatives or researchers should provide realistic outcomes as to what may or may not be determined by any cancer cluster investigation.

Suspected cancer clusters in Montana are reported to the Cancer Control Section of the Department of Public Health and Human Services (DPHHS). DPHHS receives inquiries and reports about potential cancer clusters every year and has adopted the standardized protocol below, which was developed by the CDC to ensure that each report is adequately addressed (DPHHS, 2013). The Montana procedure is a condensation of a more extensive national template.

The State of Montana's Cancer Cluster Investigation Protocol

- 1) Coordination: Each inquiry or report is referred to the Epidemiologist in the Cancer Control Section of DPHHS. The Epidemiologist contacts the local health jurisdiction to inform them of the report and determine who should respond.
- 2) Verification: If the DPHHS is designated to respond, the Epidemiologist creates a case definition and gathers all available information on the cases that prompted the call, including time period, location, and suspected environmental hazards, if any. The Epidemiologist verifies the reported cases in the Montana Central Tumor Registry and looks for more cases that fit the case definition. Once all cases are identified, the Epidemiologist calculates incidence rates in the community and in the state as a whole to determine whether there is an unusually high incidence in the community.

Epidemiologists within the health department will then begin a more in-depth statistical analysis pertaining to the number of cases in the case definition at this point. While “prevalence” is the quantity of cases that exist at any given time, the number of new cases diagnosed during a period of time characterizes “incidence”. Prevalence and incidence rates are computed as the number of cases divided by the number of people in the population at risk, multiplied by 100,000 to achieve

a common denominator to compare rates (DPHHS, 2013). Prevalence and incidence are both described by either age-specific or age-adjusted rates. “Age-adjusted rates allow us to make accurate comparisons among communities and to judge whether there may be an unusually high incidence in a given community” (DPHHS, 2013). Depending on the case definition, incidence and prevalence, epidemiologists within the health department might then reach out to federal agencies for further assistance as they have additional resources. These national agencies (CDC, EPA, NIEHS) may begin environmental sampling of air, drinking water, and soil from both suspect geographical areas and control areas, as well as more in-depth medical research such as blood and tissue sampling from both affected and non-affected populations.

Outcomes of a cancer cluster investigation

An investigation into a reported cancer cluster can yield the following outcomes:

- 1) Not a “true” cancer cluster: the types of cancers may not be related to each other or there may be excess causal factors associated with cancer within the affected population such as tobacco use, obesity, or predominance of elderly residents; or the numbers of those affected by cancer may not be statistically significant once other factors are revealed by more in-depth sampling.
- 2) A “true” cancer cluster may be determined, but no single environmental or external cause can be ascertained.
- 3) A “true” cancer cluster is verified, an obvious causal source is confirmed and remediation process addressing the source begins. (A rare outcome)

Very few documented cancer clusters have been found in communities where people live. Most verified cancer clusters are found in the workplace where there has been a shared exposure. Workplace exposures to carcinogens are “contained” and therefore easier to trace. Also, exposures occur over a much more concentrated timeframe than in the general population. Hazardous substances are more readily available within the work arena and in higher concentrations than in residential communities. For example, a link between cancer and carcinogens was found to exist among workers in particular occupations or industries that had significant asbestos exposures. One of the most well known cancer clusters emerged in the

1960's, associating a rare form of cancer that affected the lining of the abdomen and chest, mesothelioma, to exposure to asbestos (NIH, 2013). Asbestos had been used very heavily during World War II in the shipbuilding industry as well as in the manufacture of other industrial and consumer products. Approximately twenty years later, asbestos related diseases began to affect thousands of shipyard workers (Corn, 1987). Endeavoring to save lives, researchers have since identified many specific cancer-causing substances in relationship to occupational exposures.

Two Landmark Cancer Cluster Investigations

Fallon, Nevada and Sierra Vista, Arizona are among the few community based cancer clusters that have been substantiated. Both Fallon and Sierra Vista were found to have abnormally high incidence of childhood leukemias: acute lymphocytic leukemia (ALL) or acute myelocytic leukemia (AML). Because of elevated numbers of acute lymphocytic leukemia (ALL) in Fallon area children between 1997-2002 Nevada State Health Division officials (NSHD) began an investigation to determine cause. After sufficient data were gathered and analyzed, it was verified that a true cancer cluster within a child population and in a specific geographic location did indeed exist. Sixteen children had been diagnosed with ALL during this time (CDC, 2003). The NSHD, enlisting assistance from the CDC, began a cross-sectional exposure assessment of the Fallon area. The collaborative investigation sought to determine if there were any known or suspected environmental contaminants that were unique to this community. Additionally, they searched for known carcinogens and contaminants that had verifiably been linked to previous ALL clusters in children.

The combined CDC/NSHD Fallon effort included multiple other assessments and a total of 205 participants. Because of the Fallon, Nevada NHSD/CDC study, the National Institutes of Health considered tungsten as a priority chemical for toxicologic research. The International Agency for Research on Cancer has declared cobalt and tungsten carbide together to be a probable carcinogen. However, no definitive connection has been made by the federal agencies involved with the Fallon investigation, between the verified childhood cancer cluster and tungsten.

Investigators also looked at JP-8 jet fuel dumping by nearby Fallon Naval Air Station pilots, as JP-8 has high benzene content (a known carcinogen), as well as other carcinogenic volatile

organics. Fallon's Naval Air Station has the Naval Strike and Air Warfare Center and is a home to America's Top Gun program wherein significant amounts of fuels are dumped "in-air", prior to landing, to simulate landings on aircraft carriers. However, no connection was made to Fallon area children's leukemia victims and JP-8 jet fuel, by the NHSD/CDC study, possibly because they chose to conclude their study without ever sampling any outdoor air.

Sierra Vista is another high desert town bordering a military installation, Ft. Huachuca, which is a flight training base as well. Between 1995 and the 2003 collaborative investigation by ADHS/CDC/Cochise County Health Board (CCHB) (known know as Cochise County Health Department) in Sierra Vista, there was a documented incidence of 11 children diagnosed with either ALL or AML (CDC, 2006). It was determined that during this time period the "average annual rate of childhood leukemia between children ages 0-14 was 9.9/100,000 children in Sierra Vista". This rate was twice the comparable rate for the state of Arizona during the same period, wherein the rate was 4.53/100,000 children (CDC, 2006). The CDC's Sierra Vista investigation began in 2003, with biologic sampling not taken until 2005, and included only cases diagnosed between 1995 and 2003. However, an additional 7 cases of childhood leukemia were diagnosed in Sierra Vista between 2003 and 2007, with a further 5 cases of childhood leukemia being diagnosed in children who had lived in Sierra Vista for years, but were diagnosed just after moving. Because of case definitions, children not diagnosed in Sierra Vista could not be included within the cluster event.

Although there were rigorous biosampling studies undertaken within the confirmed Sierra Vista cancer cluster, three years after the investigation began, no environmental assessment was undertaken. There were no indoor or outdoor air sampling events, no indoor particulate samples were taken nor were there any soil or water samples taken in the Sierra Vista cancer cluster investigation by the CDC's National Center of Environmental Health (CDC, 2006).

Benzene, ethlybenzene, and tetrachloroethylene levels were slightly elevated in a few individuals, but the majority of the Sierra Vista study population showed no current exposure to these VOCs. Because VOCs are extremely volatile, VOC levels can vary widely from one day to the next, even within a few hours.

The CDC's 2006 "Biosampling Case Children with Leukemia (Acute Lymphocytic and Myelocytic Leukemia) and a Reference Population in Sierra Vista, Arizona - Final Report" states:

"This investigation did not identify any significant community-wide ongoing environmental exposure of concern in the Sierra Vista residents sampled".

There has not been any follow-up investigation by the CDC concerning children diagnosed after 2003, nor known children who had moved away from Sierra Vista very recently before diagnosis. As both Sierra Vista and Fallon are heavily populated by military families, who often are relocated to other military bases or complete their military service and move away, there is a pronounced chance that other children could have been diagnosed with childhood leukemia after living in either Sierra Vista or Fallon, but their diagnosis was not connected to either area. Final comments and reflections on these studies are:

- 1) Both areas are adjacent to military bases, Fallon's Naval Air Station and Sierra Vista's Fort Huachuca Army Base. Both bases provide flight training.
- 2) Both towns have a jet fuel pipeline running through populated areas, significant military air traffic, and electronic warfare/communications sites. (CDC, 2006)
- 3) Both towns are in old mining areas and may have similar metal (tungsten) contamination in specific locations (CDC, 2006).
- 4) Sierra Vista biosamples were taken a full two years after ADHS and CCHB asked for their assistance. How long after leukemia diagnosis did each case child participate in study in 2005? How long do benzenes or other toxic volatiles remain in blood, tissue and urine? Certainly, if there were at minimum two years advance notice Ft. Huachuca could "clean up their act" environmentally.

Despite the determination that a cancer cluster did indeed exist, and despite all of the resources that were involved in the Fallon and Sierra Vista investigations, no definitive causal source was ever determined.

Chapter 5

Preliminary Field Investigations

It would be nice to have tangible physical evidence of hazardous substance dumping. This chapter describes two cursory attempts to gather preliminary evidence that supports remnants of toxic materials in the area. First, radiation monitoring equipment was used to investigate sites rumored or suspected to be disposal sites. Second, water was collected from ponds, creeks, rivers and wells around the Hudson Bay Divide region to survey for residual radioactivity. Local stories about dumping usually implicated Hudson Bay Divide as the most likely locale.

Radiation Meter Surveys

If radioactive waste from the Hanford site were disposed of in Blackfeet Country, the species to anticipate are those that result from production of plutonium for atomic weapon applications. These could include some of the parent uranium and plutonium materials plus their radioactive decay daughter sequences. Radiation survey measurements were conducted at the abandoned Del Bonita Radar site, at a pit on Hudson Bay Divide and down-gradient from Hudson Bay Divide towards Lower St. Mary Lake. The instrument employed was a hand-held RPI (Research Products International Corporation) Rad-Monitor Model GM-1 Radiation/Contamination Survey Meter. This meter detects emissions from radioisotopes commonly used in research laboratories. The RPI Meter was supplied with a high sensitivity scintillation probe for detecting low energy gamma emitters such as Iodine-125. The detector utilizes a high quality photomultiplier tube coupled to a 1" x 2 mm thick sodium iodide crystal with a thin 1 mil (7 mg/cm^2) aluminum window. The detector includes a Geiger-Mueller tube with a total effective area of 1.125 inches and a window thickness of 1.5-2.0 mg/cm^2 . Its unique thin screen protects the end window and provides 86% open area for maximum sensitivity. The hazards from radiation exposure are dependent on the types of emissions, their energies and where the dose is received. An average background level of radiation is 25 counts per second.

Since Hudson Bay Divide was mentioned most frequently in covert dumping rumors, I began my cursory field radiation surveys there. On my own I was unable to locate any pit that fit the descriptions that I had heard, so I obtained the assistance of Bonita Wetselline and Jerry

Whitford who led me to the exact spot in question. The pit had been minimized by dirt and rock fill over the years and subsequently fenced by successive ranchers who leased the land and needed to keep livestock from falling into it. Land lessees had periodically brought a back-hoe in to add more fill materials. Evidently the fill kept settling such that additional material was added. At the present time there is no way to evaluate what the original pit size was.

The radiation meter was lowered by means of a rope to the bottom of the pit. The reading, viewed at a distance, was about 100 counts per second. This rate is only four times the normal background level and not of immediate concern. There is little likelihood that radioactive waste that was dumped here more than 50 years ago and covered by an unknown amount of fill would show much of a measurable reading at the surface when I took the readings. I then proceeded downhill along the surface drainage features towards Lower St. Mary Lake. This carried me eventually to a shallow pond in the vicinity of the current business, the Two Sisters Café and Campground. The meter never varied far from the 100 counts per second reading on the gauge. The previous owners of the Cafe, Glen and Joanne McKee, lived on site from about 1950-1990 and thus were in residence during the period over which the dumping took place. Glen McKee died from cancer. To date, no hydrogeologic data for groundwater flow at the site has been located.

Because the Del Bonita Radar Site (Figure 5.1) had also figured prominently in stories regarding potential radiation sources, a second set of cursory radiation surveys were conducted there. A preliminary reconnoitering of the general area was done in April of 2010 to locate the site and familiarize myself with adjacent landowners. The radar site itself was visited in June 2010. I mapped the structures and disturbed areas so that I could plan specific locations for radiation surveys in the next field season. Two measurement trips were conducted during the summer 2011 field season – one in June and the second in August. During the June survey event, readings at Del Bonita were also taken over a period of three hours including measurements at three standing barracks, four operations buildings, bulldozed sites, the radome support base, above-ground concrete trenches for radar cables, and disturbed areas. The highest level observed on this first survey trip was 200 cps at the bulldozed area (Figure 5.2).

The second trip's measurements were not alarmingly above routine background levels. The highest measurement noted was 180 cps at a small building with a chimney (perhaps a boiler

plant) to the north end of the barracks. This is nearly twice the level I found at the Hudson Bay Divide pit.



Figure 5.1. The Del Bonita Radar Site from satellite imagery of 3/14/07. (Accessed on Google Earth 3/14/12)

Readings on the radiation monitor throughout the “old dozed site” were equivalent to slightly elevated background radiation, in the 120 – 140 counts per second (cps) range. The highest reading obtained in this part of the site was at the protruding concrete slab where the reading was 200 cps, still below a level of concern.



Figure 5.2. A reading of 200 cps at the protruding concrete slab of the “old dozed site”.

Water Sampling

Besides performing the cursory radiation survey, I also gathered water samples to see if there were any measurable traces of radioactivity. Given the amount of time that had elapsed since I heard childhood tales of dumping, my expectations of finding measurable quantities of radionuclides were low. However, I at least wanted to make the attempt. Since cancer cases

have continued to arise over the years, it was necessary to be as complete as possible in locating any existent health hazards for community members.

A round of sampling for surface and personal well water in the vicinity of Lower St. Mary Lake took place the first week of April, 2011. Water samples were gathered in 25-mL scintillation vials. Collection took place along the drainage area of Hudson Bay Divide Ridge and then further north, encompassing wells from homes with multiple cancers and both Kennedy and Swift Current Creek areas (Figure 5.3). Samples were retrieved from both moving and standing water, along with home-site wells, from just south and west of St. Mary, MT (with Divide Creek being the southernmost sample) to approximately 7 miles north of Babb, MT (with Kennedy Creek being the northernmost sample). Samples were gathered directly into scintillation vials and then transported back to the University of Montana for analysis.

Selection of sampling sites was guided by looking at the pattern of cancer in families that have resided in the area (Figure 5.4). The incidence of cancer noted is not from an exhaustive examination of medical records, but has been constructed from my personal knowledge. As these investigations continue, more cases of cancer have surfaced, and another four people have died. A thorough epidemiological investigation may uncover additional cases.

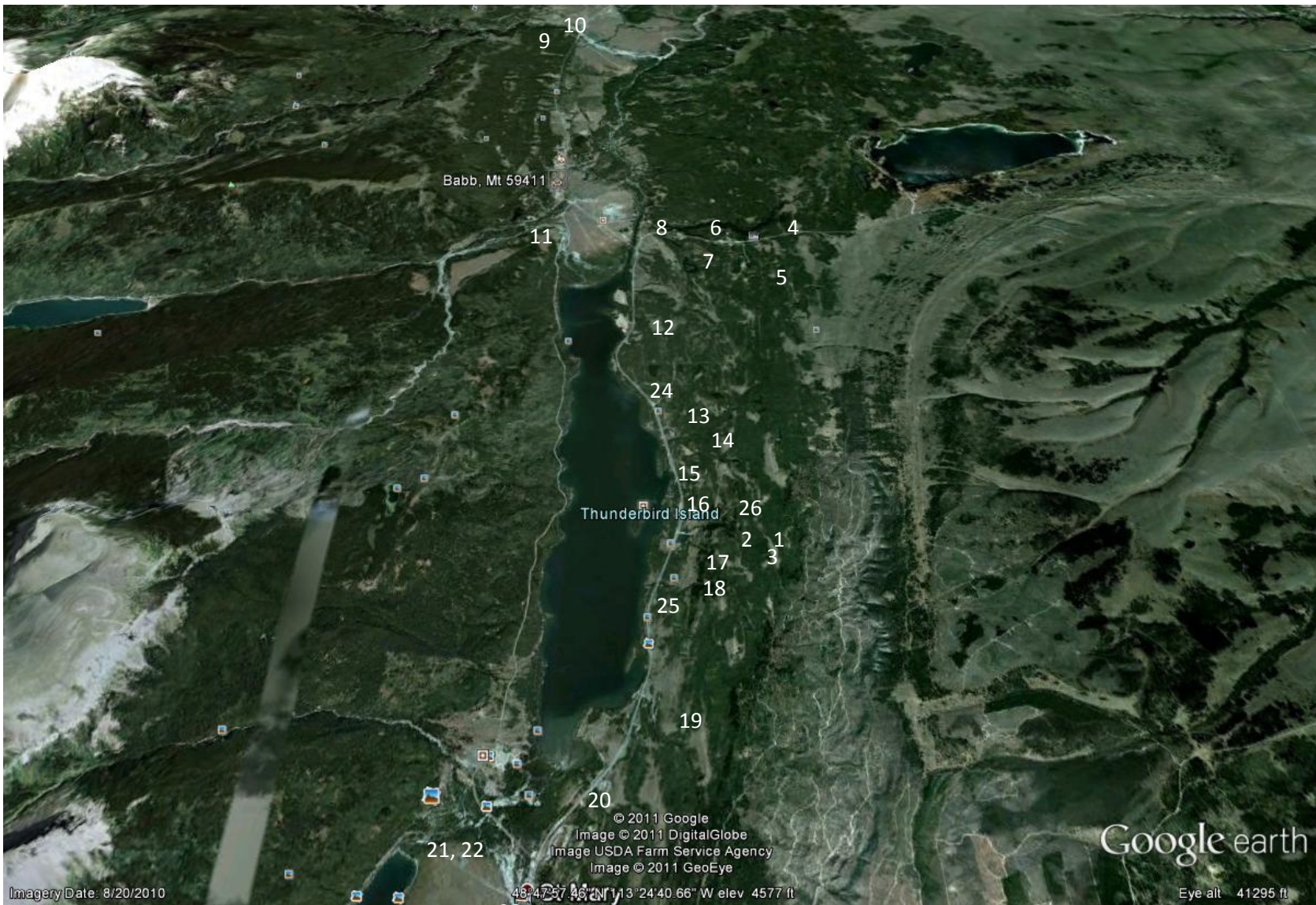


Figure 5.3. Locations for April 2011 water sampling.

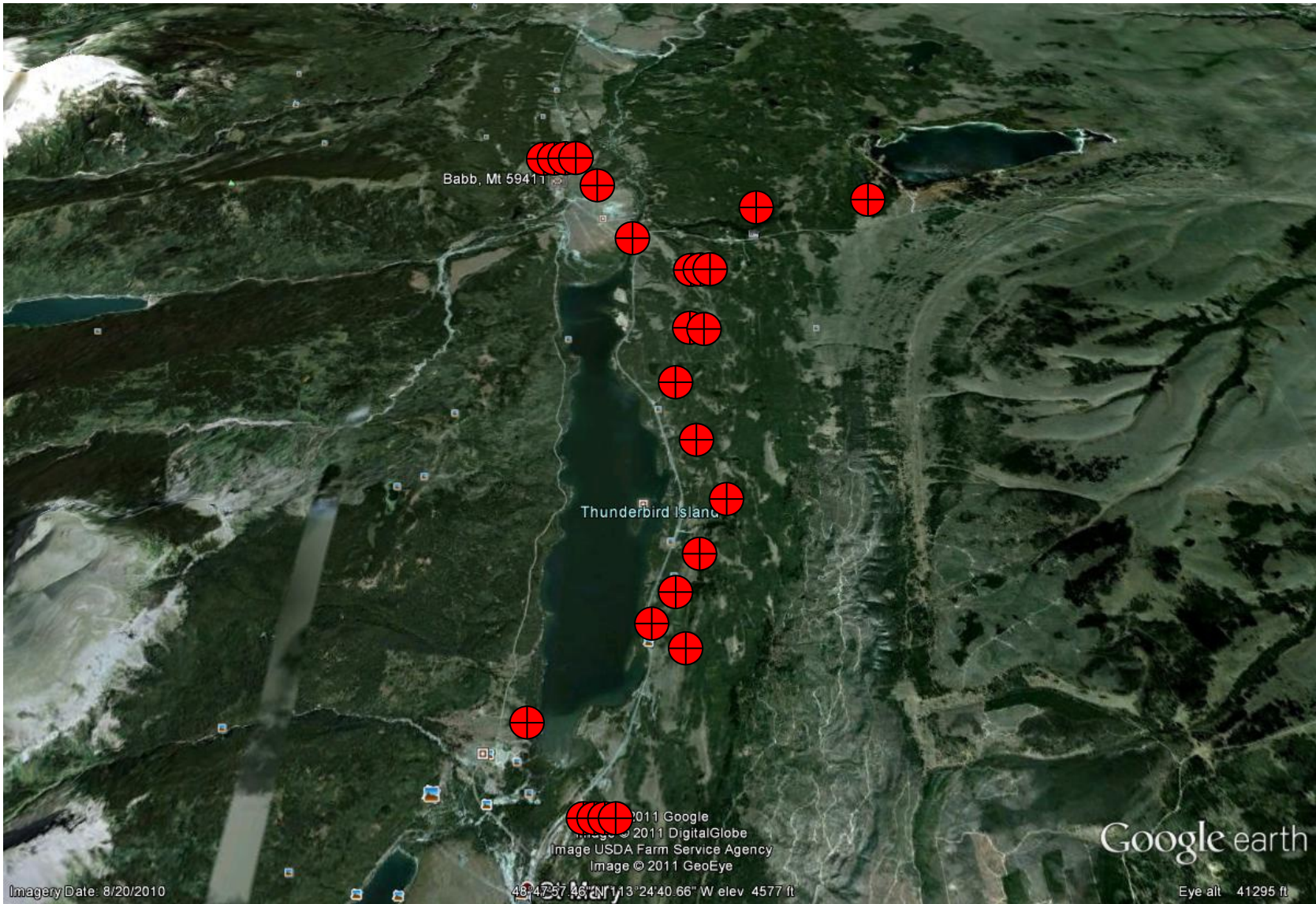


Figure 5.4. Locations of cancer incidence that guided water sampling.

A liquid scintillation counter was employed to quantify the presence of various radionuclides. The water samples were prepared for counting at a 4:1 ratio of Econo-Safe™ scintillation cocktail solution (Research Products International Corp. 410 N. Business Center Drive, Mount Prospect, IL 60056) to sample water. Once prepared, the mixed samples were counted by a Beckman LS 6500 Multipurpose Scintillation Counter possessing a 32,768 channel analyzer with an effective resolution of 0.06 keV. It was pre-programmed to measure tritium (H-3) and C-14. In addition, a “wide” spectrum setting was used to look across the entire spectral range of the instrument. Two counting runs were done - one immediately after loading the vials into the instrument and the second after the samples had been enclosed in the dark for 17 hours. This second run, after 17 hours without light, was completed so that any measurable effect from visible light on the radionuclide counts could be assessed. An examination of the data revealed no systematic error so both runs appear to be valid counts. The two runs were averaged to generate estimates of uncertainty in the counting. These are tabulated as Table 5.1. Wide open counts across the two runs are plotted as Figure 5.6. Residual counts after correcting for tritium and C-14 are plotted as Figure 5.7.

This initial round of water sampling was severely constrained by lack of funding to conduct a more extensive study. Time was donated on an instrument that is crucial to several funded research projects so that it could not be reconfigured to target radionuclides of more interest to uranium or plutonium production. Given these limitations, any evidence of atomic waste would show up in the residual plot. Residuals were not overwhelming in any sample. The average tritium content across the sample set was 21.4 cpm. The average C-14 level was 12.7 cpm. With the wide open average at 45.3 cpm, the average of the residual counts was 11.1, less than either the naturally occurring tritium and C-14. Even the worst residual values, 16 cpm at Kennedy Creek, Chewing Black Bones and Arcand’s Spring, were less than the background tritium counts. Thus, no sample gathered in this first round implicated a water source as dangerously contaminated with radionuclides.

Table 5.1. Liquid Scintillation Counter Results (average of Runs 1 and 2)

Sample No.	Location	Cancer Incidence	H-3		C-14		Wide		W - (H+C)	
			cpm	sd	cpm	sd	cpm	sd	cpm	sd
1	Pannoni – North Creek	-	24.0	5.7	12.5	0.7	47.0	7.1	10.5	2.1
2	Pannoni – South Creek	-	25.0	5.7	15.5	0.7	52.0	2.8	11.5	2.1
3	Pannoni well	-	16.5	0.7	9.0	1.4	34.0	2.8	8.5	3.5
4	Roger Walters home	1	20.5	3.5	14.0	1.4	45.5	4.9	11.0	0.0
5	Duck Lake Lodge	-	21.5	3.5	14.5	3.5	45.0	4.2	9.0	2.8
6	Leaning Tree Café	1	26.0	5.7	13.0	2.8	53.5	3.5	14.5	0.7
7	Billedeaux home	2 (now 3)	17.0	1.4	13.5	4.9	39.0	8.5	8.5	2.1
8	Peterson home	1(liv)	16.0	2.8	14.5	2.1	43.5	0.7	13.0	0.0
9	Bill Marsh home	1	17.5	6.4	11.0	0.0	42.0	5.7	13.5	0.7
10	Kennedy Creek	-	23.0	2.8	11.0	1.4	49.0	0.0	15.0	1.4
11	Swiftcurrent Creek	-	19.0	8.5	10.5	4.9	39.5	7.8	10.0	5.7
12	Chewing Black Bones	-	22.0	0.0	11.5	0.7	46.5	4.9	13.0	4.2
13	Two Sister's pond	1	23.0	2.8	12.5	2.1	42.0	2.8	6.5	3.5
14	Preuss Creek	1	25.0	1.4	15.0	2.8	49.0	1.4	9.0	0.0
15	Kipp culvert north	-	22.0	2.8	15.0	1.4	46.0	4.2	9.0	2.8
16	Darren Kipp home	1	20.5	2.1	9.5	3.5	41.5	0.7	11.5	2.1
17	Brave Rock home	1(now 2)	22.5	0.7	11.5	3.5	44.5	2.1	10.5	2.1
18	Josephine Wagner home	1	19.5	0.7	10.5	0.7	44.0	2.8	14.0	1.4
19	Snicky Johnson home	4(3 liv)	17.0	4.2	9.5	0.7	36.0	5.7	9.5	2.1
20	Trading Post stream	-	24.5	3.5	11.0	1.4	46.0	8.5	10.5	6.4
21	Upper St. Mary River 1	-	22.0	1.4	16.0	1.4	49.0	4.2	11.0	4.2
22	Upper St. Mary River 2	-	25.5	10.6	14.0	5.7	52.5	19.1	13.0	2.8
23	Divide Creek	-	16.5	3.5	13.5	3.5	40.5	0.7	10.5	0.7
24	Richard Matiatze home	-	26.5	7.8	14.0	1.4	51.0	8.5	10.5	2.1
25	Malmstrom AFB camp	-	21.5	3.5	16.5	0.7	49.5	0.7	11.5	4.9
26	Arcands spring east	2 (now 3)	22.0	5.7	12.0	2.8	48.5	10.6	14.5	2.1

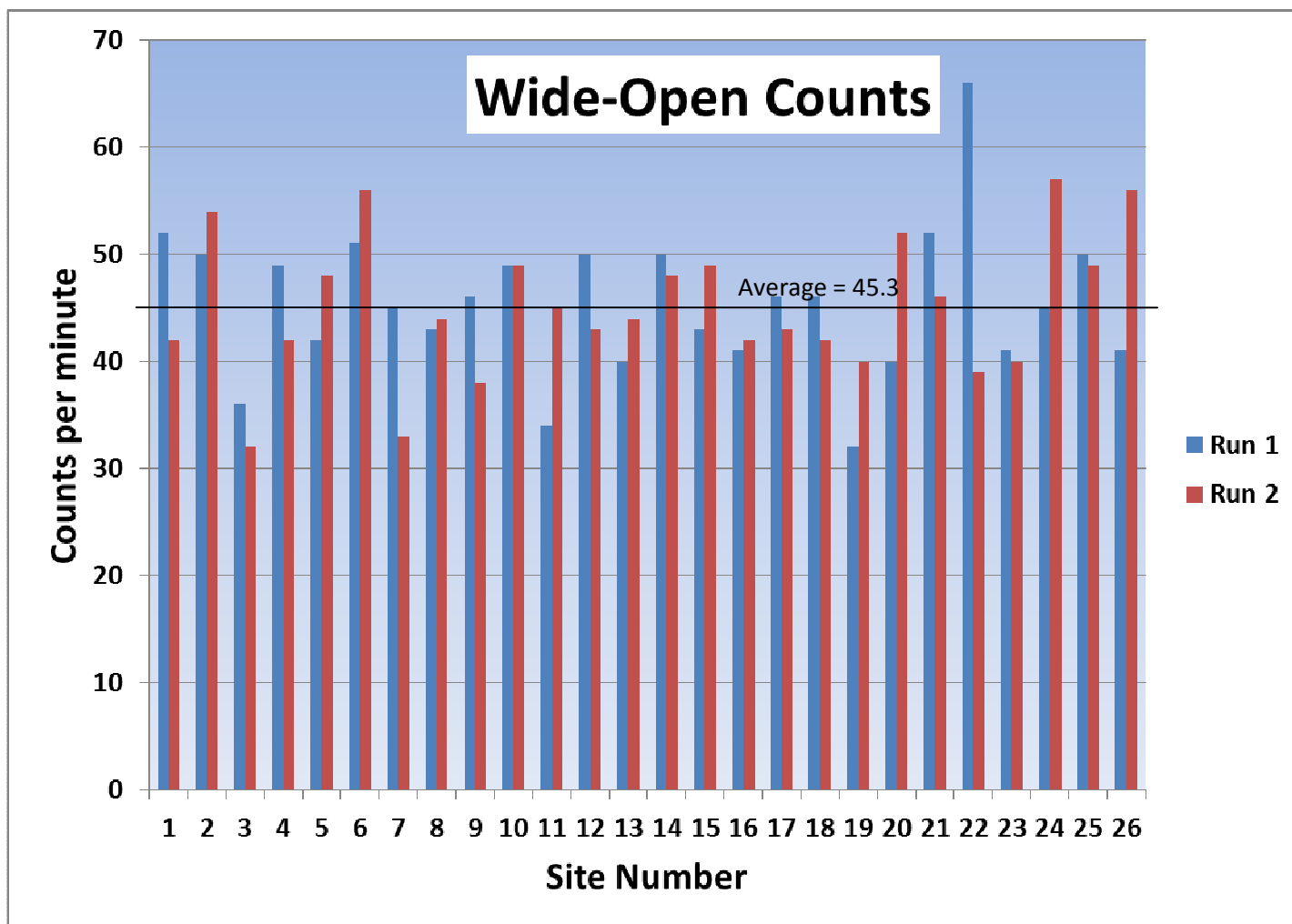


Figure 5.5. Wide open counts from runs 1 and 2

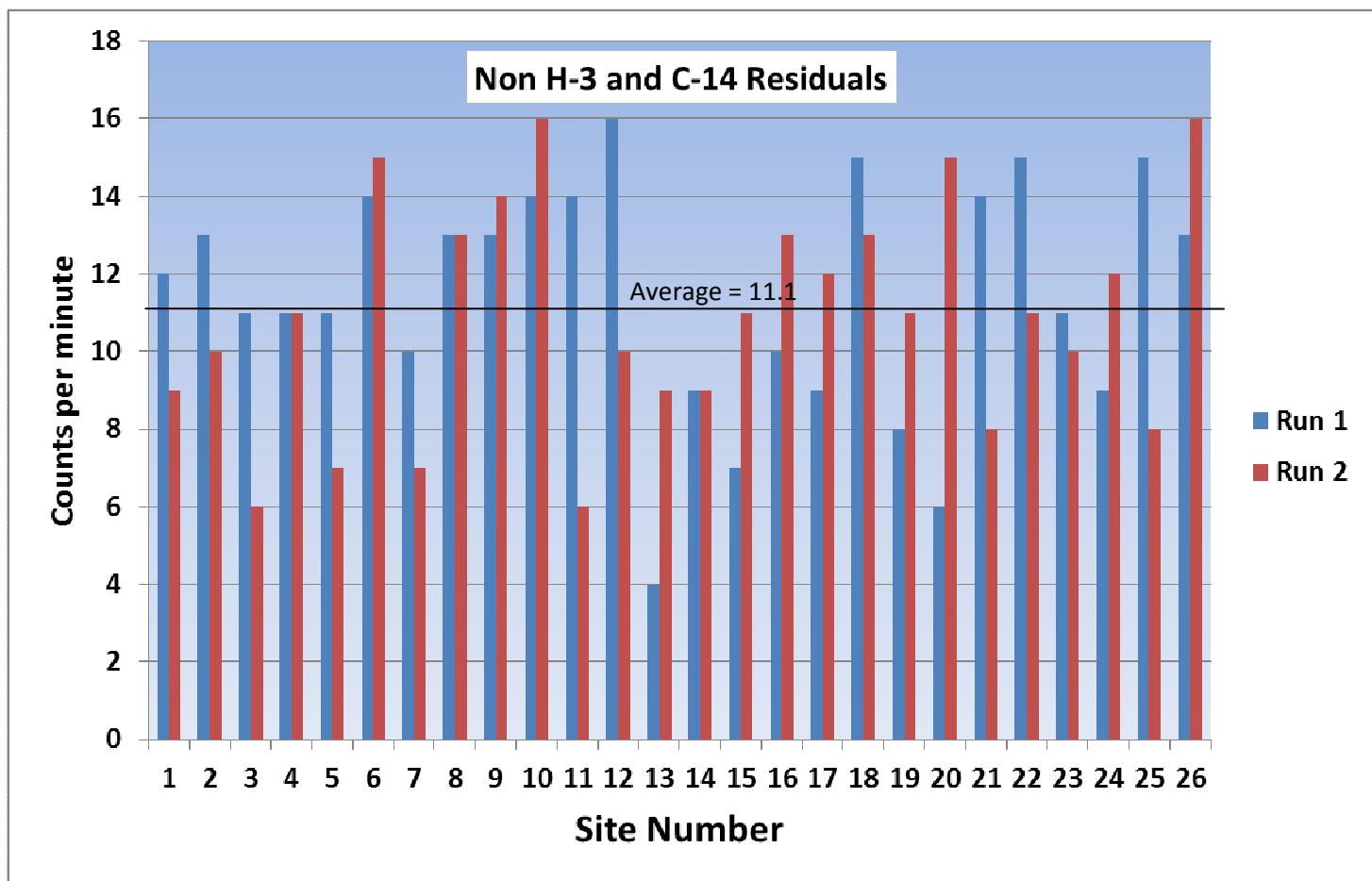


Figure 5.6. Residual counts after removing tritium and C-14.

Chapter 6 Summary of Findings

In learning further about the history of the Amskapi Pikuni people and their interactions with the U.S. government, it becomes much more plausible to understand why they might be approached to accept radioactive waste burial within Blackfeet Country. Throughout this study, oral history accounts have been collected. They indicated “something bad” had been buried within tribal lands. The areas that were repeatedly spoken about were Hudson Bay Divide Ridge, Del Bonita Road, Kiowa Camp and the Four Horn or Owl Child Lake area. Additionally, Boulder Ridge was added to the list of possible contamination events and was placed in the “late seventies...early eighties” (Running Crane, 2011). While I heard these stories in my childhood, they were usually met with skepticism when told to outsiders.

This investigation has unearthed evidence that there indeed was an attempt by the Atomic Energy Commission’s sub-contractor, the Petroleum Resource Corporation, to enter into an agreement with the Blackfeet Tribal Council. It was dated July 19, 1961 when I was 3 years old. The proposal sought to bury a minimum of fifty-million gallons of Hanford Engineer Works radioactive waste-water derived from the production of plutonium. It was deliberated on by the Blackfeet Tribal Council from July of 1961 to June of 1962, and then refused. It is not known if the Tribal Council, or even a single member, might have approved any perfunctory dumping during this year of deliberation or attempted to establish a means to accrue income via a private arrangement of his own. A verified record was discovered connecting a non-tribal member, who owned much of the Hudson Bay Divide Ridge area, with accepting the contaminated waste-water for burial on his land within the Blackfeet Nation. Plat records verify that this same non-Blackfeet, Hugh Black, had gained ownership of much of the Hudson Bay Divide Ridge area.

Rad-meter surveys at both the Hudson Bay Divide Ridge and the Del Bonita Radar Station did not detect radiation above what is expected for background levels. Cursory water samples were gathered from a twelve mile area at the base of the Hudson Bay Divide Ridge. Analysis of these samples found no radionuclides present at levels substantially different from those of naturally occurring tritium and C-14 (^{14}C). The Boulder Ridge area was closed to tribal members and non-members alike in 1982. It is still unclear who and under what authority the closure was made,

but it still off limits to anyone. Thus, both rad-meter and water sampling were not possible during this investigation.

Due to financial constraints, this investigation was limited by the capacity of the equipment that was available. Instruments capable of identifying which radionuclides are being sensed would assist in gathering more definitive evidence of plutonium production contaminants. Also, water analysis was optimized for tritium and ^{14}C . Fission product waste in uranium-235 enrichment would also include iodine-131, strontium-89, -90, and -94. Since I-131 has a half-life of eight days, it has long since all but disintegrated. However, iodine-129 and cesium-135 plus other products of breeder production of uranium, have half-lives of 15.7 million years and 2.3 million years, respectively. Sr-90 has a half-life of thirty years so, along with I-129 and Cs-135, could still be detectable if a contamination event occurred within Amskapi Pikuni lands in the early 1960's.

Because of financial and knowledge limitations, a full-scale epidemiologic study was not initiated. The time and expense of conducting a systematic to investigate a cancer cluster and to map cancer incidence is beyond the scope of a master's program.

This professional paper is intended to serve as the basis for future work comprising a doctoral project. Specifically:

Chapters 1 and 2 will be expanded and adapted into K-12 curricular materials. They will be submitted for consideration as new resources in the Federal Indian Education for All program.

Chapter 3 has established some tangible threads to possible contamination events in Blackfoot Country. It has also detailed the origin of some of the stories I heard as a child.

Chapter 4 can inform how epidemiological work towards a cancer cluster investigation can be launched. While it is not expected that a "statistical" cluster will be validated, it is hoped that much can be learned in the process.

Chapter 5 has established a network of water sampling sources that can become a more in-depth analysis of possible contaminated ground water sources. Much time has passed since dumping events may have occurred. The cursory water analysis results presented here were performed on an instrument that was not optimized for the most likely radionuclides of interest. The availability of funds to do a more rigorous set of analyses would be more definitive.

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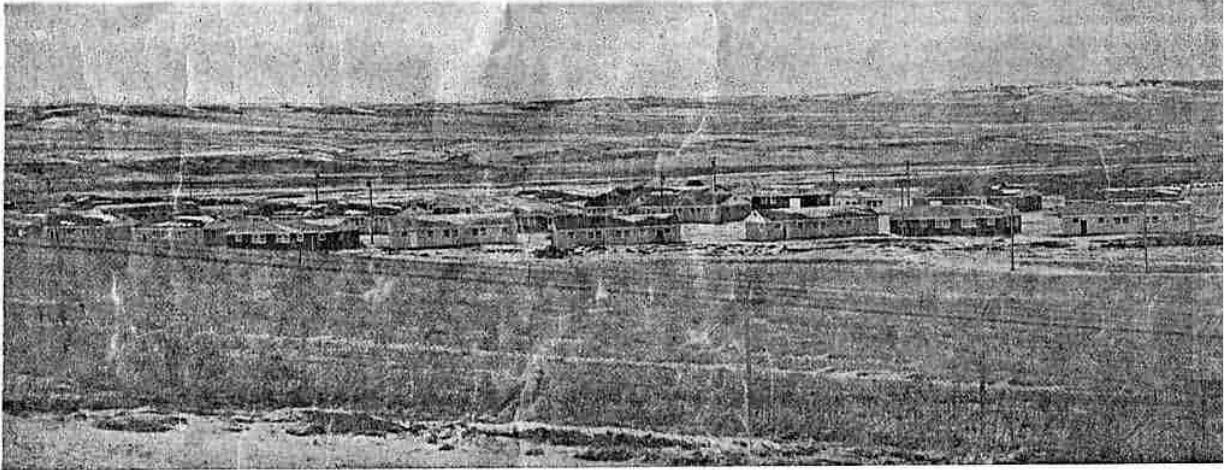
Appendix I:

Petroleum Research Corporation (PRC) Proposal for Atomic Energy Commission: Burial of Irradiated Waste from Hanford Engineer Works, 7/19/1961

Appendix II:

Communications between Blackfeet Tribal Council, PRC, Senator Mansfield, and public comment on proposed dumping and actual dumping

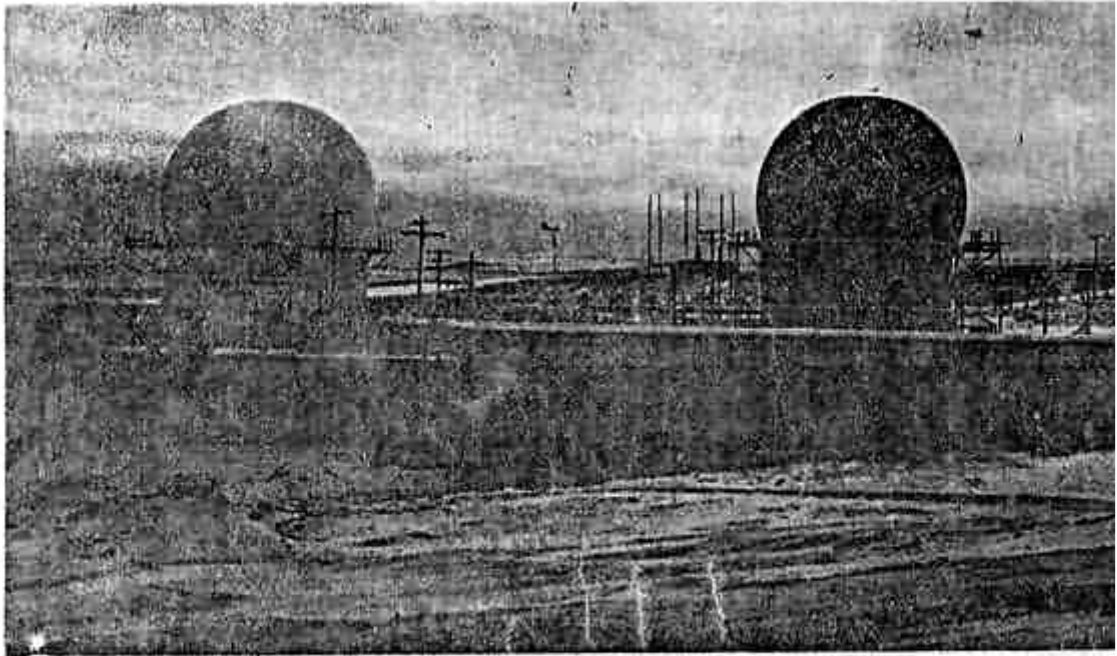
Appendix III: Del Bonita Radar Station Photographs



NEW HOUSING—Here is a Bus Ruetten photo of the much talked about base housing. Base people now living in Cut Bank will move into these 27 new units after the first of the year. Furnishings for the houses will be

allocated according to needs. Each one of the houses you see in the picture will house one family. The past few months have seen many improvements at the radar base.

Cut Bank Pioneer Press, Dec. 11, 1954
Courtesy Glacier County Historical Museum



RADOMES—These rubberoid radomes contain radar gear that keeps a constant surveillance of the sky. They are kept erect by air pressure from within. In the foreground is the building where the radar equipment is controlled.

Cut Bank Pioneer Press, Dec. 11, 1954
Courtesy Glacier County Historical Museum

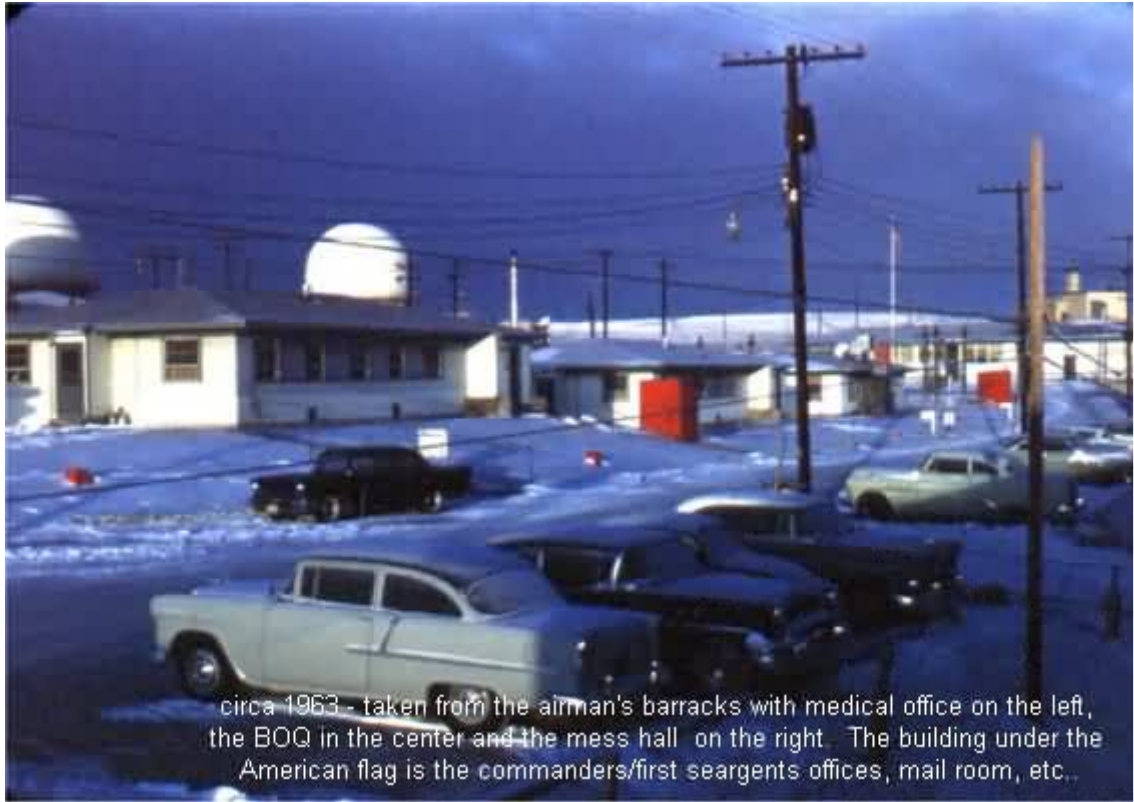


DINING HALL—Overseeing this spotless dining hall are (l. to r.) A 2-c Harry A 2-c Lyle Carr, A 2-c Glenn Mobley, T-Sgt. E. W. Adams (top gun), S-Sgt. Joe (first cook) and A 2-c Tom Reed. The hall has received nothing but superior ratings since Adams took over. They feed about 160 at each meal.

Cut Bank Pioneer Press, Dec. 11,
Courtesy Glacier County Historical Society



Photo by: Steve Tuba



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Indian celebration with Blackfeet - ca 1957



F-94s overflew the celebration







APPENDIX IV

Run 1 (instrument open to ambient light interference?)

Sample no	Sample Location	Cancer incidence	H-3 cpm	% err	C-14 cpm	% err	Wide-Open cpm	%err
1	Pannoni - North Creek		28	38	12	58	52	28
2	Pannoni - South Creek		21	44	16	50	50	28
3	Pannoni – well		17	49	8	71	36	33
4	Roger Walters home	1	23	42	15	52	49	29
5	Duck Lake Lodge		19	46	12	58	42	31
6	Leaning Tree Café	2	22	43	15	52	51	28
7	Billedeaux home	3 (1 living)	18	47	17	49	45	30
8	Peterson home	1 (living)	14	53	16	50	43	31
9	Bill Marsh home	1	22	43	11	60	46	29
10	Kennedy Creek		25	40	10	63	49	29
11	Swiftcurrent Creek	1 (living)	13	55	7	76	34	34
12	Chewing Black Bones culvert		22	43	12	58	50	28
13	Two Sisters Café pond	1	25	40	11	60	40	32

14	Preuss Creek/Cassidy	3	24	41	17	49	50	28
15	Kipp culvert north		20	45	16	50	43	31
16	Darren Kipp home	1	19	46	12	58	41	31
17	Hyrum Brave Rock home	2	23	42	14	53	46	29
18	Josephine Wagner home	1	20	45	11	60	46	29
19	Snicky Johnson home	4 (3 living)	14	53	10	63	32	35
20	Trading Post stream north		22	43	12	58	40	32
21	Upper St. Mary's River		23	42	15	52	52	28
22	Upper St. Mary's River		33	35	18	47	66	25
23	Divide Creek		19	46	11	60	41	31
24	Richard Matiatze home		21	44	15	52	45	30
25	Malmstrom AFB camp MM34		19	46	16	50	50	28
26	Arcands spring east	1	18	47	10	63	41	31

Run 2 (instrument sealed, samples in dark for 17 hours)

Sample no	Sample Location	Cancer incidence	H-3 Cpm	% err	C-14 Cpm	% err	Wide-Open cpm	%err
1	Pannoni - North Creek		20	45	13	55	42	31
2	Pannoni - South Creek		29	37	15	52	54	27
3	Pannoni – well		16	50	10	63	32	35
4	Roger Walters home	1	18	47	13	55	42	31
5	Duck Lake Lodge		24	40	17	49	48	29
6	Leaning Tree Café	1	30	36	11	60	56	27
7	Billedeaux home	3	16	50	10	63	33	35
8	Peterson home	1 (living)	18	47	13	55	44	30
9	Bill Marsh home	1	13	55	11	60	38	32
10	Kennedy Creek		21	44	12	58	49	29
11	Swiftcurrent Creek		25	40	14	53	45	30
12	Chewing Black Bones culvert		22	43	11	60	43	31
13	Two Sisters Café pond	1	21	44	14	53	44	30
14	Preuss Creek/Cassidy	3	26	39	13	55	48	29

15	Kipp culvert north		24	41	14	53	49	29
16	Darren Kipp home	1	22	43	7	76	42	31
17	Hyrum Brave Rock home	2	22	43	9	67	43	31
18	Josephine Wagner home	1	19	46	10	63	42	31
19	Snicky Johnson home	4 (3 living)	20	45	9	67	40	32
20	Trading Post stream north		27	38	10	63	52	28
21	Upper St. Mary's River		21	44	17	49	46	29
22	Upper St. Mary's River		18	47	10	63	39	32
23	Divide Creek		14	53	16	50	40	32
24	Richard Matiatze home		32	35	13	55	56	26
25	Malmstrom AFB camp MM34		24	41	17	49	49	29
26	Arcands spring east	1	26	39	14	53	56	27