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Betrayal

A Novel-In-Process

by

Norman Chance

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Author's Note

All the characters in this novel are fictional. However, many events are real. Mixing fact and fiction can easily lead to criticism that the author 'got it wrong.' I have tried to be careful in presenting historical facts, realizing, of course, that certain events have been selected for emphasis at the expense of others deemed less significant.

The novel explores repercussions stemming from nuclear, biological and chemical weapons tests carried out by the Livermore National Laboratory and other government agencies in Alaska during the 1960s and beyond. Some of these tests occurred in the Aleutian Islands. Others took place at the Fort Greely army base in Alaska's interior. Both locations were far removed from urban centers. Both brought serious health problems to construction workers, soldiers, and their families stationed in these military controlled areas. And both devastated segments of native-held lands. It was years before the Pentagon admitted that the damage caused by these tests included human beings; an acknowledgment only made public because people with access to classified information were willing to speak out. However, exposing governmental malevolence, as the novel makes clear, can carry a severe penalty.

Following the U.S. government's decision to use Fort Greely as a key Arctic outpost in its National Missile Defense program, I've decided to make selected chapters of the novel available on the Internet. I welcome input from readers in Alaska and elsewhere familiar with the issues in the expectation that the final version will be enhanced by their contribution. Those wishing to assist are encouraged to contact me at any time.

Prelude

Point Hope, Alaska, October, 1959

Late one night when Kathy Kaluk was four, she heard the sound of breaking glass. Frightened, she ran down the hall to her mother's bedroom and opened the door. Inside, her mother and an unknown man stared at the face of a large polar bear, its nose pressed against what was left of the windowpane. To her daughter, Susan Kaluk said as calmly as she could, "Stay there, Kathy. Stay away from the window." At that moment the bear, blood oozing from deep cuts to its two front paws, turned away from the small one-story wood-framed house and limped red-footed into the pale twilight of the arctic night. Assured the danger had passed, Susan opened her arms as Kathy ran to the bed. "It's all right, dear. There is nothing to be afraid of anymore."

The tall dark-haired man, embarrassed by his nakedness, quickly slipped on his clothes, grabbed a Winchester rifle attached to two wooden pegs on the wall, and walked out the front door without a word. As she watched him dress, Kathy realized he was Dan Archer, a young geographer who had arrived in the Alaskan village of Point Hope three months earlier. Anak Quinik, an Iñupiaq Eskimo elder, laughingly referred to him as a dim-witted *nalaukmiut* because he regularly asked foolish questions about hunting, fishing, and other forms of subsistence. Actually, Anak considered all *nalaukmiut* a little dim-witted. What other explanation could there be for white people who look at their wrist watch to see if they are hungry, or talk about a 'fatherless child' as if there really could be such a thing.

Kathy was surprised Anak said this in front of her since she considered herself a *nalaukmiut*, or more precisely, almost one. Her mother, a local schoolteacher from Massachusetts, explained that since her father was three-quarters Iñupiaq, this made her 'mostly Iñupiaq' in the eyes of the local community. However, non-native visitors to Point Hope saw her, like her mother, as white. To Kathy, all this seemed rather silly. Still, as a young child, she knew there was much more to learn about the world.

Ten minutes later, Dan Archer re-entered the bedroom and told Susan the bear had disappeared off the end of the sand spit. Relieved at the news, she patted her daughter's head and said, "There's no need to cry, honey. You go back to bed now. No other bears will come to our house tonight."

Relieved, Kathy accepted her mother's advice and returned to her room down the hall. Settled in bed, she glanced at the photograph of her father on top of a nearby

bookcase. Dressed in a soft brown caribou skin parka trimmed in wolverine, his friendly face inside the hood offered her a smile as if to say, "I'm here just for you." Parked in the background was an orange and white Cessna 180 with the letters 'Naval Arctic Research Laboratory' painted on the side of the fuselage. Prior to his death in a plane crash, he had been one of NARL's top pilots, flying military personnel and scientists from Point Barrow to the far corners of Alaska's North Slope. Kathy missed him terribly. She also knew their feelings toward one another could never be replaced. Not by her mother. Not by her Eskimo friends at school. And certainly not by the man who lay in her mother's bed that night.

At age four, Kathy had no idea why Dan had come to Point Hope. However, her mother did and she was horrified by what he told her. Thirty-two miles from the village along the coast of the Beaufort Sea at Cape Thompson, the Atomic Energy Commission's Lawrence Radiation Laboratory planned to detonate a nuclear device far more powerful than the bomb that decimated Hiroshima. Called Project Chariot, it was to be a unique feat of 'geographical engineering,' demonstrating the United States' commitment to the peaceful use of atomic energy.

Dan's involvement in the project began when his major professor at the University of Alaska invited him to come to his office for a chat. At that meeting he asked Dan, who had just received his master's degree in geography, what he thought of Dr. Edward Teller's graduation speech. Dan remembered it well. The famous physicist stressed the importance of nuclear power in Alaska's future development, using as his first illustration the U.S. Army's new portable reactor to be built at Fort Greely, one hundred miles southeast of the university. "When we tap the power of nuclear detonations," he said, "we can reshape the earth and bring industry and progress to all." Dan thought the idea rather grandiose although he was impressed with Teller's ability to capture the attention of his audience, especially when he proposed to carve out a harbor at Cape Thompson.

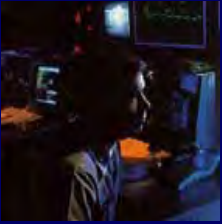
"Please God," Teller told the graduation class. "To blast out a harbor at Cape Thompson and export the nearby coal deposit to Japan, the Japanese can become the first beneficiaries of atomic explosions as they earlier became it's first victims." Turning to the issue of fallout, he acknowledged the dangers of improperly conducted nuclear blasts. However, he assured everyone present that when detonated with care by conscientious scientists, the fallout would amount to less radiation than that contained in the watch he was wearing on his wrist.

Dan's professor was not persuaded by Teller's rhetoric. Nor was Dan. But the president of the university was. Or, at least, given Teller's interest in Alaska, he realized it could be of considerable financial benefit to the institution. And he was

right. Shortly before the end of the term, the Atomic Energy Commission offered the university substantial funds to establish a 'Human Environmental Study.' Its stated purpose: to determine the potential impact of nuclear detonations on the region near Cape Thompson. At the meeting with his professor, Dan was asked if he wanted to use some of these funds to examine subsistence patterns at Point Hope as well as assist him 'study the study?' Dan immediately recognized that his participation in such an endeavor carried a certain amount of risk. One doesn't investigate the activities of a federal agency without some trepidation, especially when the research is financed by the same agency. Still, he appreciated the trust his professor placed in him and the challenge it entailed. After a brief moment of reflection, he agreed to help.

Prior to his arrival at Point Hope, Dan spent a good deal of time in the university library studying North Slope Iñupiat history, language and culture. He knew it was important to establish good relations with the people with whom he was about to stay. If the villagers didn't want a geographer in their midst, he couldn't even begin his research. Furthermore, a newcomer who continually asks questions, seems not to need work, and yet has little knowledge of how to function in the society, is bound to invite suspicion.

However, Dan need not have worried. While in Point Hope he made friends with many of its villagers, including Kathy. Even Anak Quinik, amused by his detailed record-keeping of time spent hunting caribou and harvesting whales, appreciated his and Susan's active support of their efforts to stop Project Chariot. In the face of continued public opposition, the AEC finally agreed to terminate the project in 1962. Still, one related feature remained unknown for thirty years. Its eventual discovery led Dan Archer and an adult Kathy Kaluk into a secret world of government deception reaching the highest levels of the Pentagon - a betrayal that also raised questions about Susan's suspicious death in an automobile accident near the U.S. Army base at Fort Greely eight years earlier.



LIVERMORE

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Part One

LIVERMORE

August, 1992

"We should be on our guard not to overestimate science and scientific methods when it is a question of human problems, and we should not assume that experts are the only ones who have the right to express themselves on questions affecting the organization of society"

Albert Einstein

Chapter One

Thursday, August 6, 1992

From the window of the faded gray station wagon, thirty-six year old Kathy Kaluk watched the large ranches and prosperous vineyards of California's Livermore Valley pass before her eyes. Forty-five miles east of Berkeley, she turned off the freeway and, a short while later, arrived at the town of Livermore, complete with bowling alley, pizza parlor, Chinese restaurant, and movie theater.

"It's hard to believe this place has the second largest number of PhDs in the whole country," the man seated next to her said while observing the stores that lined each side of the street. Then, headphones in hand, Ted Thorson plugged the cord into his two-way radio, punched in a frequency, and spoke a few words into the mike. A minute later he turned the radio off in disgust and said, "Still no contact."

"We're too far out," Kathy answered calmly. "Wait a few minutes. Then you'll get through."

As she drove past the library, churches, and new tract houses, Kathy noticed an unusually large number of police cars parked at various intersections along the way, their drivers somberly watching the traffic pass by. Ten minutes later, she turned on the road to the Livermore National Laboratory at the eastern edge of town. Kathy had never ceased to be amazed that the huge facility's only visible physical protection was a tall wire fence. Along much of its unguarded outer perimeter, small yellow signs with black letters warned visitors that not to loiter or trespass. The only other external indications of the high-security features were ten video cameras aimed at key entryways. Inside the fence, near a few modular trailers characteristic of an earlier era, several new seven and eight-story-cement-and-glass structures dominated the immediate landscape.

"Oh my God!" Kathy shouted as a police van with flashing lights swung alongside their station wagon. After a brief glance at Kathy, the husky, slightly bald uniformed driver jammed his foot on the accelerator. The van shot forward, quickly passed three more cars before it disappeared from view in the direction of the laboratory.

"Whew! I was sure that guy wanted to pull us over," a relieved Kathy said.

"He's just wanted to flex his muscles," Ted replied with a shrug. Slipping his headset back on, he tried the radio again.

"Alpha One to X-Ray. Can you read me?" This time his query was answered. "How are things over there?" he asked. And then, "Okay. I'll get back to you in an hour or so."

Ted then turned to Kathy and said, "Just reached Chris. Everything's ready to go."

"Good."

A few minutes later, Kathy spotted an open field filled with cars, pickups, vans, and bicycles. Directly across the highway, a dozen policemen guarded one of the main entrances to the lab. "Wow!" Kathy said. "Not a bad turnout for a Tuesday."

"Well, it is August 6th."

"True enough. Now, let's find a place to park this buggy."

"Look," Ted said, his finger pointed toward the far corner of the field. "Isn't that Serena by the green Dodge? Seems she's already got one saved for us."

Out the window, Kathy saw a tall blond woman in her late twenties gesturing energetically with both arms. Making a quick left turn, she drove across a rusty metal cattle guard, and a minute later, parked next to the Dodge. "How do you like the crowd?" Serena said, as Kathy and Ted stepped out of their car. "We told the cops they can expect a hundred people will be arrested. Maybe more."

"It seems they've taken you at your word," Ted said, nodding toward four large blue vans with Livermore Police Department printed in white letters across their sides. Parked next to the four was a gray one with several antennas sprouting from its roof. It didn't take much imagination for Ted to envision the frenzied activity taking place inside.

Detective Samuel Martin rolled the chair back from his tiny desk, stretched his arms, and, with a frown, turned to the trim-looking man standing next to a row of radios stacked against the van wall. "Jim. Who the hell is Alpha One? It's definitely not one of our people."

"Beats me," responded Special Agent James Folstead of the FBI. "But we'd better find out. Have one of your men monitor the frequency. When he comes back on, maybe we can trace the location. Do it quickly though. These guys don't spend much time on line. By the way, what's your estimate of the number of people to be arrested today?"

"Some woman from the Bay Area Peace Test said around a hundred. We have four vans ready to take them to City Hall. But the district attorney is really pissed. Can't squeeze any money out of the Feds and says his prosecution budget is bone dry. He swears that at the next demonstration, he's going to tell the sheriff to truck the bastards out of town and dump them off the Golden Gate Bridge."

"That's great. When the newspapers hear that, he'll really get his ass kicked."

"Excuse me," a young police officer interrupted, and then handed Detective Martin a slip of paper. "This just came in on a patrol car radio."

Martin read the note, passed it on to Folstead, and then turned back to face the officer. "Get me the telephone number of the lab's Security Office." A minute later, the officer returned with the number. Martin dialed it and waited impatiently for a response. Finally, it came.

"Hello. This is Detective Martin at the southwest entrance to the lab. We just received a report from one of our troopers that a gate is open across from the Sandia parking lot. Do you know anything about it?"

A few seconds later, he continued, "Did you say that gate is often left open for a food delivery?" Another pause, followed by a curse. "Hell no, I'm not sure anything's wrong. But we are in the middle of a demonstration. I think you should send someone to check it out. Have him drop by here afterwards. We're in the gray trailer next to the southwest entrance."

As he put down the phone, a frustrated Detective Martin shook his head in disgust and then looked at James Folstead.

"You know, Jim, ever since 1986, the lab has had one damn problem after another. First it was the undercover operation to investigate drug abuse among the workers. Then the EPA declared the Lab a Superfund cleanup site. Now, there are similar problems at other national labs. I'm told it's gonna take a hundred billion dollars to clean up this god-awful mess."

"That's not small change," James Folstead acknowledged.

"Yeah. It's also got our local citizens up in arms. And not only them. A couple of months ago the mayor went on record stating that it might be better if the lab moved somewhere else. Right afterwards, our congressional representative shows up in Livermore and accuses the lab of minimizing the health problem. I tell you, shit is thrown at us from all sides."

Under the steamy August heat, Kathy, Ted, and Serena walked to the center of the field where the protest leaders were headquartered. Next to a large wooden platform, environmental, religious, and peace groups sold pamphlets, posters, and pins to the demonstrators. Taped to the front of each table was a banner that prominently displayed the name of the organization represented. In the forefront of activity were CARE, the local Citizens Against a Radioactive Environment, Bay Area Peace Test, and Women Strike for Peace. Protestors at each of these tables were encouraged to read flyers, sign petitions, and purchase sweatshirts with antinuclear slogans emblazoned across the front. Not far away, large colorful banners attached to eight-foot poles proclaimed in bright red letters, "Ban the Strategic Defense Initiative," "Oppose Star Wars," and "Stop Using Depleted Uranium."

At exactly two o'clock, a muscular middle-aged man stepped onto the platform and nodded to the crowd. He then reached for the microphone, adjusted it to his height, and in a strong, resonant voice began with a question.

"What day is this?"

"Hiroshima Day," the crowd shouted back.

"What do we want?"

"Peace without nuclear weapons."

"When do we want it?"

"Now!"

As the speaker's face broke out in a broad smile, he continued. "It's good to see so many of you here. Ever since Hiroshima, our government has used the threat of nuclear weapons to extend its control over the world. It is not just the threat that is of concern. It's also the continued development of these weapons as an instrument of power. Today, we

are here to condemn the Livermore National Laboratory, a major center of research devoted to this horrendous production. We will begin with a few words from Dr. Harry Langley, a member of CARE, our local Tri-Valley organization. Many of you already know him as a family physician that has lived in the community for well over twenty years."

To the sound of clapping hands and shouts of "No More Nukes," a short, heavy-set man with deeply tanned face and thick gray hair stepped up to the microphone and nodded at those he recognized. Lowering the mike, he described the serious health and environmental hazards forced on nearby residents by the Livermore Lab and other nuclear weapons facilities across the country. In conclusion, he asked the audience, "Can you imagine what that means for our families in the city of Livermore? What it means for our children's future? If the government is so callous as to risk the health of our families here, how can there be a safe limit anywhere?"

At the close of his remarks, protestors were asked to line up behind a yellow banner with a black radioactivity icon in its center and begin their march toward the gates of the laboratory. Others formed a second line along the highway, shouting chants led by demonstration organizers. Aware the action was about to begin, Ted Thorson slipped behind one of the cars and quietly spoke into the mike of his two-way radio.

"Alpha One to X-Ray. It's now 2:25. Stay where you are for another five minutes. Then head on up. And, X-Ray, good luck."

Ted then returned the radio to his small carrying bag and rejoined Kathy and Serena near the platform. "It's all set," he whispered in Kathy's ear as the protestors, men and women, young and old, began their slow march toward the laboratory gates forty yards away. A minute later the crowd was momentarily distracted by the sound of a small explosion followed by the wail of a police siren. Turning to Ted, Serena said, "Seems someone is offering us a bit of competition down the road."

"I hope not," Ted responded. "This is hardly the time to split our forces."

The three watched closely as the first contingent of activists crossed the highway. On the other side, a lone police officer blocked their path, held up his hand, and informed them that if they entered the Laboratory without permission they would be formally charged with illegal trespass on federal property. In a seemingly choreographic display, the protestors split into groups of four or five. As they stepped on to the laboratory

grounds, they were immediately led to a blue police van. The whole ritual was observed by friends and supporters who stood along the edge of the highway, offering encouragement to those being arrested.

While the attention of the crowd focused on the action in front of them, Ted scanned the roof of the laboratory's tall concrete and glass administration building, located on a small rise sixty yards behind the entrance. Then, after a quick nudge to Kathy's shoulder, he whispered, "Look up there on the left."

Moments later, a loud cheer surged through the crowd as a huge vertical banner, fifty feet long, unrolled down the side of the administration building. Emblazoned in large bold letters were the words "Ban Nuclear Weapons Now." Hundreds of fingers pointed to the banner, along with shouts, whistles, and the clapping of hands. As newspaper reporters and television crews focused their cameras on the banner, more protestors poured across the highway onto the laboratory grounds.

Opening the door of the gray trailer, Detective Martin and Special Agent Folstead watched in frustration as the melee unfolded. Then, back inside, Martin reached for the telephone and again dialed the Livermore lab's security office. After an impatient wait, he eventually heard a small click, followed by another ring. Finally, a voice came on the line.

"We are sorry, but all security personnel are busy right now. You may remain on the line for the first available officer. If you prefer, please leave your name and telephone number and we will get back to you as soon as possible."

"Jesus! I don't believe this," Detective Martin exclaimed, his face red with anger.

"Calm down," urged James Folstead. "I'm sure their internal lines of communication are working fine. As for the guy who dropped the banner, they are bound to find him soon."

"But how did he get into the building in the first place?"

Just then, a uniformed security guard entered the door of the trailer, Folstead waved to him and said, "Perhaps this man can tell us."

"Hello, Joe," Detective Martin said. "What the hell has happened at your office? I can't reach anyone."

"You haven't heard?" the security guard asked in surprise.

"Heard what? All I've been listening to for the past fifteen minutes are speeches and chants coming from this damn protest."

"The car bomb."

"What car bomb?" interrupted Special Agent Folstead.

"Where you guys asked us to look," the guard answered. "The super said someone here called him about a gate being open across from the Sandia Lab and asked me to check it out. It's the one between the astrophysics building and the cafeteria where trucks bring in food."

"I know where it is," said Detective Martin.

"When I got there, the gate was open just like you said. Inside, a guy was fussing with his engine in the small parking space next to the cafeteria. When he saw my security van, he gave me a quick wave, closed the hood, and then walked toward a Toyota parked in the Sandia lot across the street. I was suspicious, so I rolled down my window and shouted for him to stop."

"Can you describe the man?"

"Middle-aged Caucasian with dark hair, brown slacks and sport shirt. Nothing special about him. At least not until he climbed into the Toyota. Then, he yanked the door closed, turned on the ignition, shot past the gatehouse, and without even a glance at me, roared down the street toward Greenville Road. Hey, it's really hot in here. You got anything to drink?"

"There's a soda in the fridge. Help yourself," Detective Martin answered. "So, what happened next, Joe?"

"First, I radioed the office. Told them what I'd seen and that I was tailing the Toyota down the highway. The super said I should go back to the parking lot and check out the car the guy left behind. He'd call the state police about the Toyota. So I turned around and headed back to the Lab. When I was about fifty yards away I saw a white flash, followed by a small explosion coming from the car. Everything turned bright. I mean, really bright. I grabbed a fire extinguisher, put out the flames, and waited. A minute later, another security van arrived with its siren turned on full blast. It was crazy."

"Anything left of the car?" Folstead inquired quietly in an effort to hold the element of surprise out of his voice.

"It was a mess. Burned seats and broken glass everywhere. Except the

trunk. That's where I found the metal box. It was really weird. Prying open the lid, I looked inside. All I saw was a pile of earth. Just earth, nothing else."

Turning to Folstead, Detective Martin asked, "Do you suppose the bomber and the person who dropped the banner are in cahoots?"

"Someone dropped a banner?" the security guard asked.

"Never mind," Detective Martin answered.

"You need me for anything else?"

"No, Joe. Thanks for coming by."

As the security guard left the trailer, Martin looked at Folstead and shook his head. "You know, Jim. It's not just the car bomb that gets me. It's all the political stuff that goes with it. I mean, why would anyone put a metal container full of earth in the trunk, drive it to Livermore, and then blow it up? What the hell kind of statement is that?"

"I don't know, Sam. Perhaps the lab test will tell us more."

Back at the main entrance to the laboratory, Livermore security guards and local police moved quickly to restore order. As the four vans filled with protestors departed, the crowd began to disperse. Ted and Kathy said goodbye to Serena, who was anxious to get back to the city. After cleaning up the trash that had accumulated during the demonstration, they too headed toward their station wagon at the far end of the field. At the car, Ted glanced in the rear window and saw a young woman crouched on the floor.

"Looks like we have a stowaway," Ted said to Kathy in mock surprise. At that moment, the woman opened the door, stepped outside, and soon found herself on the receiving end of warm hugs from her two friends. Then, holding the woman at arms length, Ted pointed his finger at the blue plastic card on her blouse and said, "Hey, Chris. You'd better remove your 'L' clearance badge. It wouldn't be wise for the cops to see you next to antinuclear activists with that on. Did anyone see you leave the building?"

"I don't think so. After the explosion, no one paid any attention to me. What was that all about anyway?"

"What kind of explosion?" asked Ted.

"Just before I dropped the banner, I heard what sounded like a bomb. Later, when I came out of the building, a secretary told me some guy

had driven his car into the parking lot next to the cafeteria and blew it up."

"So that's what we heard a while ago," Ted said with a bitter laugh. After a slight pause, he added, "Unfortunately, this means we have a new problem on our hands."

"What do you mean?" Chris said, looking at Ted.

"Who do you suppose the bomber was targeting?"

"The laboratory, of course, Kathy answered.

"I doubt it."

"Who then?" asked Chris.

"Us," was Ted Thorson's sober response.

Chapter Two

Friday, August 7, 1992

A quick glance at his wristwatch told twenty-seven year old Scott Jamison that he needed to stop reading the *San Francisco Chronicle* if he wanted to be on time for his nine o'clock appointment. Finished breakfast, he closed the door of his Berkeley apartment, drove to downtown San Francisco, and parked next to a tall office building on Golden Gate Avenue. In the foyer, he glanced at the glass-enclosed directory on the wall, looked down at the note in his hand, and confirmed that the office of the Department of Justice occupied the 11th floor. As the elevator carried him upward, he thought back to the event that had brought him this far. A brief telephone call inviting him to meet with a senior FBI official was unusual to say the least. Curious about the forthcoming meeting, he also felt a bit uneasy. Did the FBI know about his hack into the computer system at his university and the post of student evaluations of professors' on a bulletin board? Probably not. Anyway, that was a few years ago. Today he was a grad student in journalism at UCal-Berkeley, with a fine future ahead of him. Whatever the FBI wanted, he was sure it didn't have anything to do with his past.

On the 11th floor, Scott stepped into the hall and soon found the suite of FBI offices. As he entered a carpeted reception room, a well-tailored secretary looked up from her desk. "May I help you?"

"I'm Scott Jamison. I have an appointment to see Mr. Folstead."

"Please be seated while I tell him you're here."

While he waited, Scott observed the mandatory framed photograph of President George Bush on the wall along with an assortment of other pictures portraying FBI agents in official activities. A few minutes later the secretary ushered him into a large office. From behind his desk James Folstead stood up and greeted his visitor with an outstretched hand.

"Mr. Jamison. I'm glad to meet you. Let's sit over by the window. It's a fine view," he said, pointing to the tall buildings etched against the San Francisco skyline. "I'm about to have a cup of coffee. Do you care to join me?"

After the handshake, Scott accepted the offer of coffee and then sat down in one of two large upholstered chairs.

"Cream and sugar?" asked the receptionist.

"Black is fine," Scott answered.

As the woman left the room, special agent Folstead eased into the other chair and said, "I expect you are curious why I invited you here today. Let me begin by saying how sorry I am about your father's tragic death six years ago."

"You knew him?" Scott asked.

"Not personally. But I'm aware of his exemplary record as an FBI agent. It must have been a terrible shock to the family."

"It was."

"And now you are a graduate student in the Journalism School at Berkeley."

"That's right," Scott answered, noting that the man next to him seemed to know a fair amount about his past.

"What are your plans after graduation?"

"Find a job as a newspaper reporter. Perhaps do a little freelance work on the side."

"Sounds like an excellent choice, Scott. I hope you don't mind my use of your first name?"

"Not at all."

"As a journalism student, you are probably aware of the terrorist bomb that exploded yesterday at the Livermore National Laboratory."

"Yes. I read about it in the paper this morning. I expect it is keeping you rather busy."

"Actually, it's only one of several cases presently under investigation."

"Is *Earth First* another?" Scott inquired, aware of another newspaper

story about Judi Bari, a radical environmentalist who had been severely injured when the Subaru in which she and a friend were riding exploded. While in the hospital, she was arrested by the police who claimed she and her companion knew there was a bomb under the seat.

"That's right," acknowledged Folstead. "We've have that group under investigation for several years now.

"Are any of these folks based in the Berkeley area?" Scott asked, suddenly aware of the reason he had been invited to the FBI office.

"We believe so."

"Can you tell me about them?"

"One will suffice. Over the past few years the American Peace Test has brought large numbers of people from across the country to participate in week long demonstrations at the nuclear test site in Nevada."

"I never heard of the organization."

"That's not surprising. For whatever reason, the press hasn't given it much attention. But their demonstrations are seriously taxing local law enforcement officers. Just last month, 1000 people were arrested in one weekend alone, including media figures like Carl Sagan."

"Carl Sagan, the scientist? He's hardly a terrorist."

"I'm not suggesting he is. But we think terrorists may be infiltrating the Bay Area branch of the organization."

"And you'd like my help?"

"If you are interested. We are also prepared to cover the cost of your tuition and fees as well as a small monthly stipend."

After a moment's reflection, Scott looked up at James Folstead and said, "I'd like to think about it for a few days."

"I wouldn't expect anything else. If you do decide to assist us, you will be assigned an agent with whom you will have regular contact. Until then, I strongly urge you not to mention our conversation with anyone else."

"Of course."

Standing up, Folstead again offered his hand, saying he looked forward to hearing from Scott in the near future.

"Thanks, Mr. Folstead. I'll be in touch."

On his return to Berkeley, Scott parked his car behind the Café Mistral and entered the building. In a back room, he replaced his sport coat with a waiter's jacket, looked in the mirror to straighten his tie; then entered the dining room and approached his first customer. A short while later an attractive dark-haired woman entered, sat down at a nearby table, and open a newspaper. Her light-colored blouse, slacks, and soft leather shoes did little to set her apart from other professional women living in the Berkeley area. It was the pin attached to her collar urging "Ban Nuclear Weapons Now!" that caught his attention. That and the hand-carved ivory figurine she wore around her neck.

As he approached the table, Scott asked the woman, "What's your pleasure?"

"Coffee," she answered briefly, before returning to her newspaper.

"Cream and sugar?"

A slight nod was her only response. With the order in hand, Scott carefully placed the cup and saucer on the table. "You look a little down," he said, eyes focused on her face, lips parted in what he hoped was a warm smile.

"I was reading about the car bomb that exploded yesterday."

"Apparently the Livermore Liberation Front did it."

"You've heard of them?" the woman said, looking up at Scott for the first time.

"Only in the newspaper."

"I don't think there is any such group."

"Really?" Scott said. "Who do you think bombed the lab?"

The woman hesitated. Then, taking a deep breath, answered sharply, "The FBI. Those sons-a-bitches never stop."

"You think the FBI set off the car bomb?" Scott asked in amazement.

"Why not? Any organization the FBI sees as a threat to the status quo is going to get infiltrated, discredited, and, if possible, neutralized. It happened to the Black Panthers and the American Indian Movement. Now it's our turn."

"You mean the antinuclear movement," Scott said, glancing again at the blue and white pin attached to her blouse.

"Yes."

"Did I see you at the Bancroft Library the other day?"

"Probably. I work in the archive collection," the woman responded, the sudden shift in topic having deflated her interest in Scott once again.

"Hey. That's interesting. I'm in the journalism school. Have you come across any library topics I might use for my semester term paper?"

"How about FBI repression?"

"I was thinking more...." As Scott paused, unsure what to say next, the woman continued her questioning.

"Have you ever published anything?"

"Not yet," Scott answered, a little taken aback at the aggressiveness with which she posed the question. "But I will have a short piece in the *Chronicle* later this month."

"*The San Francisco Chronicle*?"

"Yup."

"About what?" the woman asked. Clearly, she was not about to waste her time with someone who simply wrote filler stories for weekend editions.

"Drugs on campus."

"Oh," she said with a trace of disappointment. Then, finishing her coffee, she placed a dollar bill and change on the table and prepared to leave.

"Your name is Kathy, isn't it?" Scott asked in the hope he could continue the conversation.

"Kathy Kaluk. How did you know?"

"I saw your name on a credit card when you were here last week. I'm Scott Jamison. I'd like to learn more about the antinuclear movement and the FBI. Especially if you'd help me."

"Are you asking me as Scott Jamison the individual, or Scott Jamison, the journalist?" Kathy said as an amused smile spread across her face.

"Both," Scott responded with a grin, disregarding the third option offered by special agent Folstead earlier in the day.

Kathy immediately wondered whether his request was serious or whether he was just coming on to her. He seemed sincere enough. But such an expression could just as easily mask other interests. She decided to give him the benefit of the doubt.

"Sure. I'll be glad to talk with you about it sometime."

"How about this afternoon? I'm off at four o'clock. We can go over to the Bear's Lair for coffee or a beer."

"I've got too much work to do right now. But if you're serious, I know someone who can."

"Who's that?"

"Ted Thorson. He works at the computer center. He also recruits people to participate in demonstrations at the nuclear test site in Nevada. Go see him. If he trusts you, he might even share his thoughts on the FBI. Will you be at the debate tomorrow evening?"

"What debate is that?"

"The Undergraduate Student Forum is the sponsor. It's entitled, The Role of Nuclear Weapons in the post-Cold War World."

"Really. Where's it being held?"

"At the Manson Auditorium. Begins at seven-thirty. Helen Caldicott is one keynoter. A senior scientist at Livermore will present the opposing side."

"Will you be there?"

"Of course."

"Then I'll come."

As Kathy departed, Scott wondered how much his decision to attend the debate had been influenced by the topic, and how much by his conversation that morning with the FBI. As for Kathy, she was surprised that Scott hadn't seen any of the posters she and others had placed on every campus bulletin board they could find. Of course, some had been removed; one of which lay on James Folstead's desk.

After a quick glance at the poster, Special Agent Folstead leaned forward and spoke into his intercom. "Sofia. Do you know if Bill Gregory was able to contact the Berkeley informant last evening?"

Receiving a negative answer, he asked her to bring him the Berkeley file anyway. A glance at its thick contents reminded him how helpful the FBI's campus contacts had been over the past few years. Seated into a chair by the window, he opened the file, removed the most recent transcript, and began to read.

FEDERAL BUREAU OF INVESTIGATION

ANTI-TERRORISM UNIT - SAN FRANCISCO OFFICE

450 Golden Gate Ave, San Francisco, CA 94102-7400

Memorandum

Topic: July debrief of informant Pluto (file 135) on the forthcoming nuclear deterrence debate at UC-Berkeley and recent changes in the antinuclear movement.

Date: Thursday, July 30th, 1992

(This interview was conducted in the debriefing room of the San Francisco office of the Federal Bureau of Investigation. Special Agent William Gregory is in

charge.)

AGENT GREGORY: It's good to meet you. Please, sit here by the couch. As you know, due to Agent Obermiller's transfer to another region, I am now your new contact person. Although Obermiller briefed me before he left, my knowledge of the scene at Berkeley is still quite limited. So, you'll have to bear with me if my questions appear a little simplistic.

PLUTO: No problem. For the most part, the campus is relatively quiet. There are the usual meetings with the same old crowd. However, it looks like a new debate on nuclear deterrence will be pretty lively. The two speakers include a Livermore Lab scientist and Helen Caldicott from Harvard. She's the founder of Physicians for Social Responsibility. I'll let you know what happened afterward.

AGENT GREGORY: Good. Obermiller also said some of the antinuclear organizations on campus have had a difficult time financially.

PLUTO: That's for sure. Especially the Livermore Action Group. They really screwed up and are now largely out of the picture. Of course, the breakup of the Soviet Union is the most important issue right now. Political activities in the Berkeley area are definitely on the decline. Even American Peace Test leaders are concerned. Maybe you'd better stir up some action on campus to justify my future pay. [laughter]

AGENT GREGORY: Please. Be serious. I'd like to hear more about the American Peace Test. Especially about the Russian they want to bring to campus?

PLUTO: You mean Olzhas Suleimenov?

AGENT GREGORY: Yes. Who is he?

PLUTO: He's an engineer and poet from Kazakhstan. Three years ago he told the Soviet press that radioactive material had leaked into the atmosphere from

underground nuclear tests at Semipalatinsk. At the time, he was campaigning for a seat in the Congress of People's Deputies. Shortly after that he organized a huge demonstration at which five thousand people showed up. They demanded a thorough investigation of environmental pollution and an end to secrecy surrounding radiation victims. They have scheduled another big rally for August 6th. The same day as the one at Livermore.

AGENT GREGORY: Why invite Suleimenov here?

PLUTO: Both Russian and American Peace Test groups want to send delegations to each other's countries. When Livermore was added to the DOE's superfund list, Ted Thorson thought Suleimenov would be an ideal person to give a lecture at the Livermore Town Hall.

AGENT GREGORY: The Bay Area Peace Test organizer?

PLUTO: Right.

AGENT GREGORY: How much contact do you have with him?

PLUTO: Not a great deal. He spends most of his time as a programmer at the Berkeley computer lab.

AGENT GREGORY: And his friend, ah... (pause]

PLUTO: Kathy Kaluk?

AGENT GREGORY: Yes. What's her background?

PLUTO: She's from Alaska. Grew up in an isolated Eskimo village on the northwest coast. Her mom was an English teacher from Massachusetts, her father, an Inupiat bush pilot. Years ago, there was a lot of talk in Washington about peaceful uses of atomic bombs. The Livermore physicist, Edward Teller, wanted to blast out a harbor a few miles from where she lived. The Atomic Energy Commission agreed. Needless to say, the villagers were furious. Did everything they could to stop

it. Even sent letters to President Kennedy. Apparently they succeeded, because Teller finally canceled the project. According to Agent Obermiller, Kathy's mom was actively involved. That's all I know.

AGENT GREGORY: Interesting. I'll check it out. Unfortunately, I have to leave early today and will be out of town for the rest of the week. At our next meeting, I'd like to hear more about Kathy Kaluk.

PLUTO: Sure. But before you go, I have a question for you.

AGENT GREGORY: Shoot.

PLUTO: As Obermiller may have told you, I'm graduating in December. I've been approached about a job elsewhere and I'd like a recommendation from the Bureau.

AGENT GREGORY: I'm sure we can arrange something. Give me the appropriate name and I'll write a letter stating that you have been of substantial assistance to the Bureau while at Berkeley. No particulars though. We never divulge information about our informants to anyone. By the way, I have a little surprise for you. You can pick it up from the secretary on your way out.

End of Interview. Transcribed by M. Schaffer, 7/30/92.

As James Folstead placed the transcript back in the folder, he noticed a letter addressed to Obermiller from the Alaska office of the FBI. It was in response to Obermiller's request for information about Kathy Kaluk. In it, Special Agent Danon Wentworth said the office had no data on Ms. Kaluk other than the fact that she was the daughter of Susan Kaluk and that she grew up in Point Hope. However, the office did have an extensive file on her mother. Shortly before Mrs. Kaluk's death in an automobile accident in 1984, she had been under surveillance for trying to obtain classified data on biological and chemical weapons testing at Fort Greely. If Obermiller wanted further

information regarding Mrs. Kaluk, he should let Wentworth know.

Intrigued by the mother-daughter activist tie, Folstead considered writing Wentworth. But his decision was interrupted by a flashing red light on his intercom followed by Sofia's voice informing him that the FBI laboratory report on the Livermore bomber's car had arrived. She was sure he would like to see it right away. A copy was also on its way to the security office of the National Laboratory. The report stated that the box of earth contained in the trunk of the car was radioactive. Folstead immediately picked up the phone, dialed the Livermore Police Department, and asked to speak with Detective Martin. Told he was in a meeting, Folstead requested that a message be left on the officer's desk to call him back as soon as he was free. That it was urgent.

Chapter Three

Saturday, August 8, 1992

When arrived at Sather Gate on the UC-Berkeley campus, Scott Jamison walked down the tree-lined roadway to reach Manson Auditorium where the evening debate was to take place. In a large hallway just inside the building, members of Physicians for Social Responsibility and the American Peace Test handed out flyers, while at the other end of the hall, two workmen from the public relations department of the Livermore National Laboratory had put together an attractive glass-enclosed diorama of the laboratory, complete with miniature buildings, roadways, vehicles, and scaled-down people.

Given a leaflet from a tall blond woman standing by the entrance to the auditorium, he was surprised to find it filled with squares. The highlighted square at the center contained a single dot while all the rest held thirty or more. "What's this?" he asked the woman.

With a hand cupped against her lips, she whispered conspiratorially, "Look on the back." Turning the sheet of paper over, he read in bold print that the highlighted center square with one dot represented the three megatons of explosive power used in all of World War II. The other 110 squares with thirty or more dots symbolized the total power of the global nuclear arsenal in 1990 as 16,000 megatons – an impressive statistic.

"Are you looking for Kathy?" the woman continued. "She's with a student over there," nodding her head toward the American Peace Test table on the other side of the room. Did Kathy tell this woman about their time together at the café? Quite likely, he decided, slightly shocked at the realization.

"Yes. I see her," Scott answered. "What's your name?"

"Serena," she answered briefly, and then turned back to face the incoming crowd.

At the table, Scott listened while Kathy spoke with a student about the next demonstration in Nevada. When the man moved away, Scott greeted her warmly. "I didn't know you worked for the Bay Area Peace Test."

"I don't. I'm just helping Ted with the literature table while he's out of town."

"Ted?"

"Thorson. The person I told you about at the café. He's due back late tonight."

"Of course, I almost forgot."

A quick glance at the faces in the hall told Scott that except for Kathy and her friend Serena, he didn't recognize a single person. Aware that Kathy had other responsibilities, he hesitated to ask her to sit with him but decided to anyway. To his surprise, she agreed. As they entered the crowded auditorium, she waved to a young woman on the other side of the room. With Scott close behind, she went over to the woman and gave her arm a slight squeeze. With Scott at her side, she said, "Scott, I'd like you to meet Christine Robertson. And Chris, this is Scott Jamison, a grad student in journalism."

Clearly uncomfortable, the woman gave Scott a brief nod before saying she had come with a group of people from the Livermore Laboratory and needed to join them. At that moment, a student strode to the center of the auditorium stage followed by a well-dressed, middle-aged woman. Quickly seated, Scott and Kathy watched as the man ushered the woman to a chair behind the podium and then approached the microphone.

"This evening the Undergraduate Student Forum is pleased to sponsor a debate on a vitally important topic: 'The Role of Nuclear Weapons in a post-Cold War World.' Following their presentations, each speaker will have an opportunity to respond to the remarks of the other. As you can see by microphones located at the front of the two aisles, we are also prepared to receive questions from the floor. Now I would like to introduce our first speaker, Dr. Helen Caldicott. An Australian physician, Dr. Caldicott is a highly regarded leader of the antinuclear movement. She has devoted many years to an international campaign to educate the public about the medical hazards of the nuclear age. She also served as a professor of

pediatrics at the Harvard School of Medicine, founded Physicians for Social Responsibility and Women's Action for Nuclear Disarmament, and was nominated for the Nobel Prize in 1985. Let us all give her a warm welcome."

At the podium, Dr. Caldicott acknowledged the appreciative applause. Then, after she beckoned to two young women with metal buckets at the edge of the stage to come closer, she asked everyone in the room to close their eyes. As the audience quieted, she continued. "Please listen carefully. This sound represents the entire explosive power of World War II." At that point she bent the microphone down to catch the sound created by the first young woman as she dropped one BB pellet into her metal bucket. Then, as the second woman slowly poured 5,000 BB pellets into her metal container, Dr. Caldicott continued, "This represents the explosive power of an all-out nuclear war today. Is this what we want for our future?" Scott noted that the auditory impact of the message on the audience was a profound silence. Assured of their full attention, Caldicott then began her presentation, each sentence uttered in carefully measured tones.

"Our debate today is about the role of nuclear weapons in a post-Cold War world, a world that is supposedly much safer now that the Soviet Union is no longer part of the political spectrum. Nothing could be farther from the truth. With thousands of nuclear missiles armed and ready to launch in Russian and American bunkers, we must still be prepared to face a nuclear holocaust."

Dr. Caldicott then shifted her attention to the recent war in the Persian Gulf.

"I also want to remind you that the United States has conducted not one but two nuclear wars. We are all familiar with the one against Japan in 1945. The second took place in Kuwait in 1990. The first nuclear war fissioned one plutonium bomb and one made of uranium. The second nuclear war was limited to depleted-uranium weapons. Nuclear fission was not involved. This excess uranium, composed mainly of the uranium isotope U-238 is called 'depleted' because it has a lower than normal content of the isotope U-235, the fissionable material. But it has one outstanding property. It is extremely dense and capable of penetrating heavily armored vehicles – hence, its use in the Persian Gulf War. During a six-week period, 940,000 DU shells were fired from US planes and 14,000 harder DU shells shot from tanks. Many of these ignited when they hit their targets. In

addition, on two other occasions, vehicles loaded with uranium shells accidentally exploded, showering friends and foes alike with tiny particles of deadly uranium."

Dr. Caldicott next outlined a series of steps needed to ban all nuclear weapons, including those using depleted uranium. When she finished, those in support of her presentation roundly applauded her. Others in the auditorium remained silent. As Caldicott returned to her chair, the head of the Student Forum introduced the second woman as Florence Oleman, director of the Visitor Center at the Livermore Laboratory. Smiling, the woman acknowledged with a wave of her hand the polite applause that greeted her.

"I'd like to begin by expressing the laboratory's appreciation of the invitation to join you this evening. I also urge you to come to our Visitor Center in Livermore where we can provide you with far more information about the lab and its history. For obvious reasons, I am unable to offer you an actual tour of the premises. In its place, the center has a diorama that will enable you to take a virtual tour. As you may have noticed, we brought the diorama here this evening. Everyone is welcome to view it in the hall outside."

The woman then turned to the middle-aged man seated behind her. "And now, I have the pleasure of introducing one of our most distinguished laboratory scientists. Dr. Howard Moseley is a physicist active in nuclear weapons research for over twenty years. You realize, of course, that due to the classified nature of the research, certain topics must be excluded from his remarks. Otherwise, in the question period, please feel free to raise any issue you like."

As the audience focused their attention on Dr. Moseley, he stood up and strode to the podium. Tall, lanky, bespectacled, and bow-tied, he prefaced his opening remarks with a broad grin.

"Although I visit Berkeley regularly, I seldom have a chance to speak before such a large student audience. It's an opportunity I have looked forward to for a long time. Why? Because I remember my own activist days at Cornell in the late 60s. Yes, I was an anti-Vietnam war protestor at the time. I understand the frustrations felt by those opposed to defense-related research at Livermore, Los Alamos, Sandia, and the other national laboratories. It is true that a major task at Livermore is to design nuclear weapons of the highest quality possible. This was also the Soviet goal. Although the Soviet Union is

no more, other potential enemies remain that may someday increase the threat of nuclear war. I am convinced the one way to reduce this threat is *not* to ban nuclear weapons but to make them so horrendous that such a war becomes unthinkable. This is why our research is so important. Only through our continued efforts can world peace be achieved."

At that point a student in the audience stood up and shouted, "Are you suggesting that it is more ethical to work on nuclear weapons than on conventional ones?" Immediately, the Undergraduate Student Forum leader returned to the microphone to remind the audience that time had been set aside at the conclusion of the presentations for questions from the floor.

Dr. Moseley then continued. "While the question just raised may not have been appropriate at this particular moment, I am at least glad it was asked. Moreover, my answer to the question is, yes, it is absolutely more ethical to work on nuclear weapons than conventional ones. Let's look at it this way. Which has killed more people, nuclear or conventional weapons? It is the latter, of course. Suppose that our government had not undertaken nuclear weapons research. What would we do if another country with those weapons decided to use them against us? Far more lives would be lost. The point I want to make is this. A large stockpile of nuclear weapons is essential to prevent nuclear war and to save lives. If I thought these weapons would ever be used, I personally would not work on them. But I am convinced that will never happen because we continue to be prepared for it to happen. If we are ever again unprepared like we were at Pearl Harbor we may find ourselves in a holocaust that would make the planet unlivable. And no one wants that. Am I right?"

The reaction from the audience was mixed. A few indicated their strong agreement while others booed. Scott felt the tension rise steadily. As Dr. Moseley continued to build his case, negative voices grew louder. Finally, a young man rose near the center of the auditorium and began to chant, "Livermore. Livermore, No more Livermore!" Immediately, as if on cue, five others unfurled a bright yellow banner with black letters, "Ban Nuclear Missiles Now!" As they walked down the aisle, they were joined by others streaming down a second aisle. At that moment, five campus policemen stepped forward to keep the protestors from taking a position of prominence in front of the audience.

"Come on Scott!" Kathy shouted as she rose from her seat and ran toward the melee of fists, curses, and shouts that had erupted just below the stage. Fearful of the angry confrontation, Scott felt uncertain what to do. Should he stay where he was or follow her? At that moment, he felt a hand grasp his arm. It was Serena urging him to follow Kathy down the aisle. Suddenly, an older man with long gray hair tied in the back leapt onto the stage and reached for the microphone.

"Stop this at once," he shouted. "This is definitely not the place for such behavior. Stop it right now! Let the scientist speak!" Disregarding the voice behind the microphone, the crowd continued to flow out through the exits. Curious about the speaker, Scott asked Serena, "Who the hell is that?"

"Dick Dellinger. He's one of the old timers in the antinuclear movement. Right now, he's in charge of the American Peace Test in Nevada. I didn't know he was going to be here tonight."

As Scott was about to ask another question, Serena interrupted him. "Excuse me, but I need to make sure the literature table is okay. See you later." As Serena hurried up the aisle, Scott saw Kathy shouting at one of the campus police. "Officer, these guys are not part of any campus organization I've ever seen."

The policeman responded, "Look, lady. It doesn't make any difference whether they are members of a campus organization or not. They disrupted this function and it's our task to restrain them. Now, please get out of the way so we can complete our job."

"Let's go," Scott said, pulling at Kathy's sleeve. "Serena is already out in the hall."

"Damn it, Scott! These bastards aren't students. I'm sure of it. They were brought in from outside to stir up trouble."

"Isn't that a bit paranoid?"

Ignoring Scott's remark, Kathy stormed back up the aisle and into the hall beyond. At the far end of the room, a small group of students stared at shards of broken glass that had once covered the Livermore Laboratory's attractive diorama. Florence Oleman, clearly distraught, complained bitterly to a sober-faced campus security guard as he jotted down notes on a piece of paper.

"Hey, Kathy! A friend of yours just arrived!" Serena shouted as Kathy surveyed the sea of broken glass in front of her.

"Dan," she responded happily, recognizing the tall middle-aged man next to Serena. "I'm so glad you are here. I got your letter. When did you arrive?"

"A few minutes ago. Sorry to have missed the debate." Then, after a quick scan of the broken diorama, he continued, "What was the fracas about?"

"No. I mean, when did you get here from Alaska?"

"I flew in Sunday on my way to Las Vegas."

"Why Las Vegas?"

"It's about Project Chariot. I'll explain later."

Kathy then introduced Dan Archer to Scott and Serena as a geography professor at the University of Alaska in Anchorage who had also been a good friend of her mother. After the introduction, Dan looked at Kathy and said, "We have a lot to talk over. Unfortunately, I have an 11:00 o'clock flight back to Anchorage in the morning. Which is better for you? Get together now or have an early breakfast at my hotel?"

"Let's do it now. There's a café not far from here that serves wonderful coffee. I'll drive you there."

Aware that Kathy planned to spend the rest of the evening with her friend, Scott said a quick goodbye and left the auditorium. On the way back to his apartment, he tried to sum up the two positions raised in the debate. Dr. Moseley's argument was eminently reasonable, although the horrors of nuclear war described by Dr. Caldicott were not to be discounted either. There were other questions, too. Who were the protestors who broke up the meeting? Kathy's interpretation seemed rather far-fetched. However, if she were right, why would they do such a thing? Perhaps the answer lay with Ted Thorson. He decided to call him soon.

As the crowd dispersed, Kathy helped Serena pick up the leaflets and other handouts lying on the American Peace Test table. When finished, she and Dan headed to her car a short distance away. A few minutes later she parked next to one of Berkeley's popular espresso

bars and led him inside. Over coffee and a croissant, Kathy learned the reason behind Dan's trip to Las Vegas.

"A few weeks ago, a historian at the Rasmuson library in Fairbanks found a letter in the archives written by a U.S. Geological Survey scientist. It stated that a large shipment of contaminated earth was collected from a 1963 nuclear detonation at the Nevada Test Site and buried at Cape Thompson. Apparently, the burial was to evaluate the long-term environmental impact of the soil on the arctic tundra – a secret experiment following the demise of Project Chariot. I visited the Department of Energy's new Coordination and Information Center in Las Vegas to see if I could find any additional information on the burial."

"What did you find?"

"Nothing. The data is still classified."

"The people at Point Hope must be furious."

"They are. Whatever trust they had in the federal government is completely gone." Reaching into his jacket pocket, Dan handed Kathy a typewritten paper; then added, "Here is the draft of a press statement the Village Council plans to release shortly."

"Thanks. How serious is the problem?"

"We're not sure. But everyone worries about the high cancer rate in the village. Iñupiat leaders demand that the Department of Energy provide them with all the details of the burial. But so far, there has been no response. Actually, the Livermore Weapons Laboratory that shipped the contaminated earth to Cape Thompson was part of the university's radiation lab. Do you think you might be able to gain access to those old files?"

"Not likely, but I'll give it a try."

"Good. If you turn up anything, let me know right away."

As Dan finished, Kathy looked into his eyes and said quietly, "I really miss you. I wish we could find a way to see each other more often." His response was a complete surprise.

"How would you like to move back to Anchorage?"

"What do you mean?"

"The director of Denali Institute wants to hire someone with your skills."

"What's the Denali Institute?"

"It's a new environmental research center affiliated with the university. It received a large federal grant two years ago. So much data is pouring in, the director needs more staff to organize it all. You would be an excellent candidate."

"I love Berkeley. But given the present economic problems in the university, I could lose my job. If that happens, I'm at least open to the possibility."

"The director's name is Tom Manning. He's rather tight-assed but knows his stuff. Shall I suggest he write you?"

"Sure, as long as there isn't any commitment to apply."

Finished with their coffee, Kathy drove Dan to his hotel. In the lobby, the two friends hugged and said goodbye. On the drive back to her Berkeley apartment, Kathy felt exhausted. It had been an incredibly long day. Tomorrow she would try and trace down information on Project Chariot in the Bancroft library archives. Hopefully, Ted could assist as well.

Chapter Four

Sunday, August 9, 1992

At noon, the thermometer gauge on the bank building across the street from Ted Thorson's San Francisco walkup told him what he already knew – that a highly unusual hot spell had arrived. Located on the third floor of a long row of white stucco houses, his was a typical apartment for that part of the city. While it would have been more convenient to live near his work at the UC-Berkeley computer center, he enjoyed San Francisco. It was an exciting city, run by an active, progressive leadership. Quite an improvement over Las Vegas, where he had once helped organize the direct-action segment of the American Peace Test.

His political days began a decade earlier when, as a Berkeley student, he was arrested at the famed 1982 Livermore Lab protests. The year before, Ronald Reagan had been elected president. While the defense industry geared up for a huge budget increase, the antinuclear movement suffered a serious decline. New struggles in Central America and Africa drew away large numbers of supporters. Then, on the fortieth anniversary of the bombing of Hiroshima, Soviet leader Gorbachev unilaterally called a halt to nuclear weapon tests in the Soviet Union – followed shortly thereafter by his acceptance of the US-proposed Intermediate Nuclear Forces Treaty banning missiles in Europe. As the Cold War de-escalated, mainstream groups like the Nuclear Freeze Campaign and SANE lost many of their volunteers. Eventually they merged, hired paid canvassers to rebuild their membership, and turned away from grassroots organizing in favor of legislative lobby campaigns.

By contrast, the direct-action segment of the movement declared their commitment to continued civil disobedience. But instead of Livermore, they focused their attention on the large nuclear test site in Nevada where protests were already in progress. Western Shoshone Indians, whose tribal lands had been taken away from them

by the government for nuclear weapons testing, were livid. Similarly angry were United States Army veterans who had been forced to march into mushroom clouds. Utah farm families, whose lives were tragically diminished by cancers and other serious illnesses brought on by living 'downwind' from the Nevada test site, also participated. Within a surprisingly short period of time, the American Peace Test, or APT as the organization came to be known, had drawn large numbers of protestors to weekend encampments in the middle of the Nevada desert, seventy miles from Las Vegas. On his return to a new job at Berkeley, Ted continued his political activism, helping to strengthen the APT ties with the remaining antinuclear groups in the Bay area. And he knew press support in that endeavor was essential.

Thus, when the journalism student, Scott Jamison, called that morning and asked to speak with him about the recent bomb blast at Livermore and the FBI, Ted agreed, although with a certain amount of skepticism. He occasionally spoke with reporters about antinuclear protests and the Nevada Test Site. But the FBI was another matter. Only after he learned that Kathy Kaluk had suggested his name did he feel comfortable about Jamison's visit. And to be absolutely sure, he gave Kathy a call to confirm that she did, in fact, know him.

"Hi, Kathy. How did the debate turn out last night?"

After listening to Kathy's vivid rendition of the events of that evening, Ted asked whether her opinion of Scott Jamison was positive.

"I think so. I don't know him well but he seems honest enough. On two occasions Scott expressed interest in our activities. He's enrolled in a summer course in investigative reporting at the journalism school in Berkeley. Who knows, he might even become active himself."

"Okay," Ted answered. "He'll be here soon. I'll let you know how it turns out."

"Ted," Kathy continued, her voice shifting abruptly. "Several things have happened recently that I need to talk with you about privately."

"You want to meet here?"

"Sure."

"How about three o'clock?"

"I'll be there."

An hour later, a buzzer informed Ted that Scott Jamison was in the entryway downstairs. As Scott climbed the stairs, Ted met him in the hallway. "Glad to meet you, Scott. Come on in. There is not much insulation and the air conditioning is poor. But I've got a coke in the fridge if you'd like one."

"I'd love it," Scott answered, wiping his forehead with the sleeve of his shirt. "This is unbelievable weather for San Francisco." Handed the coke, Scott sat down on a nearby couch, took a quick sip, and then removed a small notebook from his pocket. "I hope you don't mind if I take notes on our conversation."

"Just what is it you want to know?" Ted asked, still uneasy about the forthcoming interview.

"I've decided to write a term paper on the antinuclear movement for my investigative journalism seminar. Your friend Kathy Kaluk said the FBI might be responsible. When I asked for more details, she suggested I speak with you."

Seated at the other end of the couch, Ted Thorson propped both feet on a small coffee table, looked directly at Scott, and said, "I'd like to begin this conversation by asking you a question. You are a journalist, or soon will be. Most journalists I know encourage the person interviewed to speak his or her mind while keeping their own ideas and assumptions to themselves."

"The 'facade of objectivity' is what Professor Selden calls it," Scott said with a trace of amusement.

"That's a good expression. I think I'd like your professor. So, peel away your facade of objectivity and tell me where do you stand on the issue of nuclear weapons?"

"I'm not as knowledgeable as I should be, so I don't have a strong opinion one way or the other. However, I did go to the debate on Friday and learned a lot."

"Kathy told me what happened. Too bad the Livermore scientist didn't have an opportunity to finish his presentation or you would have learned even more."

"She thought protestors weren't even students."

"It's quite possible."

"In a recent lecture, Professor Selden spoke about the FBI's Counterintelligence Program back in the 60s and 70s and how J. Edgar Hoover approved the use of agent provocateurs and misinformation campaigns to neutralize radical groups. Do you think that kind of activity is still going on today?"

"Absolutely. And it isn't limited to so-called radical groups."

"What do you mean?"

"Take Dave Foreman, for example. He's one of the founders of the environmental organization, Earth First. Not long ago, the FBI mounted a campaign against them in Prescott, Arizona. They called it Operation THERMCON after the explosive chemical thermite. The plan was to link Foreman and Earth First with explosives so they could develop a terrorist case against them. Not long afterward, an FBI agent and a hired informer infiltrated the group. In no time at all the members were urged to blow up an electrical transmission tower. While the agent didn't succeed in getting Earth First to use explosives, he and the informer did talk them into using a cutting torch."

"I heard a little about Earth First," Scott said with a slight nod.

"The target was a power line used to pump water from central Arizona to irrigate the lawns of Phoenix and Tucson. Last May, four members of the organization were arrested in the desert with their acetylene torch. The undercover FBI agents chose the target, drove the truck, and taught the activists how to use the torch. At the trial, the two activists got prison sentences, the FBI informer got \$54,000 cash along with a grant of immunity from prosecution for various crimes, and the FBI agent went back to work in his home office. We learned an important lesson from that experience."

"Which is?"

"That the person offering to get an explosive is always the FBI agent."

"Do you think the FBI has infiltrated the American Peace Test?"

"I assume so. They try to exploit our weaknesses, exaggerate them, and then turn them into something that will destroy us. If they can demonstrate that we are a domestic terrorist organization, they have

pretty much carte blanche to do whatever they want."

"Is there anything you can you do to stop it?"

"That's where people like you come in. You want to be a journalist, perhaps even an investigative one. We need these skills badly. If you want to help, just be sure not to hide your own views under a cloak of objectivity. Put them right out there for all to see. Like Gary Hart or Noam Chomsky."

"US Senator Hart?"

"Yes. He made a statement about the FBI back in 1975 that's still true today. Here. You can read it while I make a telephone call."

Ted rose, walked over to his desk drawer and after sorting through several old files, drew out a bright-colored flyer and handed it to Scott. As Ted left to make his call, Scott looked down at the page. Superimposed on its face was U.S. Senator Hart's Congressional letterhead followed by a short paragraph.

1975 SENATE SELECT COMMITTEE ON INTELLIGENCE ACTIVITIES AND THE RIGHTS OF AMERICANS

Over the years we have been warned about the danger of subversive organizations that would threaten our liberties, subvert our system, encourage its members to take further illegal action to advance their views, organizations that would incite and promote violence, pitting one American group against another... There is an organization that does fit those descriptions, and it is the organization, the leadership of which has been most constant in its warning to us to be on guard against such harm. The [FBI] did all of those things.

When Ted returned, Scott expressed his surprise that the FBI would ever receive such criticism from a Senate committee.

"That was a long time ago," Ted replied. "The anti-Vietnam War movement was at its peak. Protests were daily events. The government's policies were exposed in lots of ways. The Senate Select Committee on Intelligence Activities was just one of them."

"Not like today, I guess."

"Things aren't that bad today. I'm pleased with the Bay Area's participation in the American Peace Test. Join one of the weekend trips to Nevada sometime. There is a big rally in Vegas on Saturday. Busses provide transportation to the test site. Of course, those who walk through the entrance are arrested."

"You mean the police are already on hand?"

"Sure. We brief them ahead of time. Tell them how many people are expected. They even put planks across the cattle guard so no one will twist an ankle when crossing to the site. Of course, some protestors are more aggressive. They cross the barbwire fence along the highway. But they never get more than a hundred yards or so before the police go after them in dune buggies and haul them back out."

"How many people show up in a given year?"

"Last year it was around eight thousand. About a fourth of them are arrested. The rest hold signs, sing songs, chant, and things like that."

"Do the police keep their cool?"

"Pretty much. It's not a big deal. Those arrested are bussed to Tonopah, about 150 miles away, and then released without charges. Come join us and find out for yourself."

"Perhaps I will," answered Scott.

"Good," Ted Thorson replied, knowing full well that Scott wasn't about to engage in any activity that might put him in trouble with the law.

An hour after Scott's departure, Kathy arrived at Ted's apartment. After tossing her briefcase on a nearby chair, she plopped down on the couch and said, "This heat is killing me. I can hardly stand it."

"How about a cold drink?"

"Anything, as long as it has ice is in it."

With two glasses of ice water in hand, Ted sat down across from Kathy and asked, "What's the news you wanted to talk with me about on the phone?"

"Dan Archer wrote recently. Said he was going to Las Vegas to

research Department of Energy archives and wanted to see me on his way home. I told him about the debate and he said he'd try to make it. Showed up right at the end, after which we went out for coffee. Ted, you won't believe what I just learned about Point Hope."

"Try me."

"Remember the 1962 underground nuclear test in Nevada?"

"The Sedan test?"

"Yes. Dan says containers of contaminated soil from that detonation were shipped to Alaska and buried at Cape Thompson. That's only thirty-two miles from where I grew up. The Iñupiat often go to the Cape to hunt caribou and look for birds' eggs. You can imagine how angry the villagers are about this. They are also worried that the radiated soil may be the cause of their high cancer rate. So far, the Department of Energy has refused to comment. And Dan couldn't find any additional information in Las Vegas. However, he's certain the data is stashed away somewhere in the Radiation Laboratory archives right here in Berkeley. It turns out I can't gain access, but perhaps you can through the computer center."

"Not likely, but I'll try. What's the other news?"

"Dan wants me to apply for a job in a new environmental research institute at the University of Alaska in Anchorage. I told him I was happy here at Berkeley, but if the state cutbacks continue, I might be forced to look for work elsewhere."

"You mean move to Anchorage?"

"Yes. What do you think?"

"Your call, Kathy. But I'd sure feel sad if you left the area."

"How sad, Ted?"

After a brief pause, Ted gave Kathy a big smile. Then, moving to the couch, he put his arm around her shoulder, squeezed it, and gave her a gentle kiss on the cheek. "A lot," he answered warmly. "Now, what else do you have to tell me?"

"Friday morning, Clifford Spellman, a physics professor, came over to the reference desk at the library and asked what archival material we had on the geology of the Aleutian Islands. While I was checking on the computer, a graduate student walked up to him and said there

was a small problem in the lab and he was needed there right away. Spellman put his briefcase on the counter and asked me to keep it for him until he returned. It was surprisingly heavy, which I suppose is why he asked me to hold it. Anyway, I placed it on a shelf under the counter. Then my snoopy mind got the better of me. I was curious why a physics professor was interested in Aleutian geology. When I unbuckled the briefcase and looked inside, I saw two hefty text books, a set of lecture notes, and a large envelope addressed to him from the Department of Defense. The envelope contained a confidential report on the 1971 *Cannikin* nuclear test on Amchitka Island. I had no idea the test was so huge. It was the largest underground nuclear weapon ever exploded in the U.S."

"What did the report say?"

"It said the bomb was supposed to be detonated at the bottom of a vertical shaft 5,000 feet in the ground. But the Livermore scientists screwed up. Instead, they exploded it almost a thousand feet above the safe depth. The result was a collapsed chimney shaft and a big crater a mile wide and sixty feet deep. Samples from the shaft revealed venting of about 14,000 cubic feet of radioactive krypton-85 gas which apparently isn't much. The problem is that civilian employees at Amchitka were exposed to unusually high levels of radioactivity. The DOE estimated between 350 and 600 people worked on site to prepare the blast, clean up the mess afterward, and later build a military radar station. Since then, forty or more workers have contracted cancers directly linked to radiation exposure. As yet, they don't know how many have died. I copied the letter and part of the report on our zerox machine. But I was so scared Spellman might come back, I only did a dozen or so pages. Twenty minutes later, he returned, thanked me for holding his briefcase, and then excused himself to go to a class."

"Wow, Kathy! That took a lot of nerve."

"There's more. The report also refers to a letter written by the wife of a construction foreman at the test site. If she can get enough information, she plans to sue the government for the death of her husband. She's convinced his cancer came from work on the cleanup. Ted, we can help this woman, and probably others too. I made a copy for you to read. I can't discuss it now and I'm tied up tomorrow. But I'm free all day Tuesday. Can we meet in the afternoon or evening?"

"Sounds good to me. I'll give you a call."

After Kathy's departure, Ted sat on the couch and sorted through the pages she had given him. A few dealt with details having to do with americium-241, cesium-137, and similar toxic substances that were beyond his level of comprehension. However, the conclusion was unequivocal. One page described how, following the detonation, water from several aquifers flowed over the test site, spreading an unknown quantity of radioactive materials over the whole area. A second reiterated Kathy's story that an as yet unknown number of construction workers brought in to work at the site had already died of leukemia and other radiation-related cancers. A third was an interview with a Livermore scientist in which he discussed whether indigenous native populations should have been removed from the region. Using a felt tipped pen, Kathy had circled a sentence she found particularly offensive. *"I think it was a very unique situation and one in which the federal government could have caused more difficulty if we would have removed the Eskimos from such places as Amchitka because of the radiation."*

With a sigh, Ted leaned back on the couch and reflected on what he had learned. Clearly, Kathy faced a difficult choice. To make the documents public would severely damage the integrity of the Department of Energy. It would also give substantial assistance to those Cannikin construction workers having to pay the supreme penalty due to the miscalculation of the Livermore scientists. But in the process, Kathy would certainly lose her job – or worse.

ADMU 0908 UNCLASSIFIED

SURFACE OF AMCHITA ISLAND IN THE
ALEUTIAN CHAIN OF ALASKA

AT 5:00 P.M. EST NOVEMBER 6 1971

SCIENTIFIC PROGRAM

THE ATOMIC ENERGY COMMISSION'S
LAWRENCE LIVERMORE LABORATORY WHICH

WAS RESPONSIBLE FOR WEAPON DESIGN AND WAS IN CHARGE OF THE SCIENTIFIC ASPECTS OF THE TEST REPORTED THAT ALL CLASSIFIED EXPERIMENTS DESIGNED TO MEASURE THE DEVICE PERFORMANCE RECORDED DATA WAS PERFORMED AND THAT PRELIMINARY EXAMINATION OF THE RECORDS INDICATED THAT THE DESIRED INFORMATION WAS OBTAINED. THE DATA RECORDED ON FILM AND TAPE WILL REQUIRE DETAILED ANALYSIS. WORK HAS BEGUN TOWARD DRILLING INTO THE RADIOACTIVE MELT IN THE DETONATION AREA TO OBTAIN SAMPLES OF THE MELT FOR RADIOCHEMICAL ANALYSIS AT THE LIVERMORE LABORATORY IN CALIFORNIA. IF THE WORK PROCEEDS ON SCHEDULE, THE DRILLING PROCESS IS EXPECTED TO BE COMPLETED BY SPRING, 1972. THE ANALYSIS OF THE MELT ARE REQUIRED TO EVALUATE FULLY THE PERFORMANCE OF THE SPARTAN WARHEAD WHICH WAS TESTED.

RADIOACTIVITY

THERE HAS BEEN NO DECTABLE RELEASE OF RADIOACTIVITY TO THE MARINE OR SURFACE ENVIRONMENT AS A RESULT OF CANNIKIN. MEASUREMENTS WILL CONTINE FOR A NUMBER OF YEARS.

Chapter Five

Tuesday, August 11, 1992

At ten o'clock, Special Agent James Folstead looked out his office window at the city skyline sparkling under the sunshine of a beautiful summer morning. Life was good. His work at the Bureau was up to standard. His lovely wife Helen was a special joy, as was his hillside home in Lafayette. This day was also special for another reason. It was his fifty-first birthday. Earlier, he and Helen had enjoyed a leisurely breakfast of cottage cheese pancakes on their deck overlooking the valley below. When he arrived at his office, he saw on his desk a tiny cake topped with a yellow candle. Next to it was a card from his secretary, Sofia, along with three memorandums. One was an FBI lab report that contained photographs of the Livermore bomber's car interior and the metal box full of radioactive soil. The second was a reminder from Sofia that Scott Jamison had requested an appointment with him for ten-thirty that morning. And the last was a request from the regional deputy director to call him back about classified documents illegally obtained by a staff member at the UC-Berkeley's Bancroft Library.

Seated in his chair, Folstead pressed the intercom button and said, "Sofia. That's a really nice surprise on my desk. And I don't mean the memorandums. How did you know it was my birthday?"

"Well, Mr. Folstead," Sofia answered with a cheerful laugh, "I do have access to your résumé."

"That's true. Still, I appreciate your thoughtfulness. By the way, did Mr. Jamison say anything else in your phone conversation about our meeting this morning?"

"No. He was polite but seemed a little distant."

"All right. Show him into my office as soon as he arrives."

Twenty minutes later, Folstead heard a brief knock and looked up to see Scott Jamison in the doorway.

"Hi, Scott, Come in and sit down. How's everything at the university?"

"Good. One more exam and the summer term will be over," Scott answered as he sat down in a chair next to the special agent's desk.

"Ready for a little relaxation, I expect. Tell me, have you made a decision about the matter we talked about earlier?"

"I called my brother in New Haven last night. He encouraged me to accept your offer. But I've been under a lot of academic pressure recently. As a result, I am hesitant to take on any additional responsibilities right now."

"I can understand that," Folstead said with a slight frown. "Still, I'd like to find a way for you to join our team. Tell you what. For the time being, let's keep our relationship informal. Anytime you come across information that you think might be of interest to the Bureau, give me a call and we can talk. How does that sound?"

"It sounds fine to me, Mr. Folstead," Scott answered. "I appreciate the offer."

"Glad to hear it, Scott. And good luck in your journalism studies."

As Scott departed, the special agent smiled briefly. While it wasn't likely Scott would replace Pluto, he could turn out to be a good contact. Seated back at his desk, he glanced at the third memorandum; then asked Sofia to contact the office of the deputy director. What, he wondered as he waited for the call to go through, did the deputy director want to tell him about the leak of classified documents on the Berkeley campus?

Finishing his breakfast that same morning, Ted Thorson picked up the phone and called Kathy. "You know what I think?" he asked when she answered.

"What?"

"We need a break. You have the day off and I can get away from the computer lab around one o'clock. How would you like to go to Point Reyes this afternoon?"

"Ted, that's a fabulous idea. Can we include a long walk along Drake Beach?"

"Definitely. Shall I pick you up at your place around one?"

"I'll be waiting."

Shortly after one o'clock, Ted parked his car in front of Kathy's Berkeley apartment. A minute or so later, he saw her wave at him from the second-floor window, and then came down the stairs and got into his car. She looked tired but happy. He felt much the same way. As he drove north along Route 101, he turned and with a devilish grin, asked, "When was the last time you played a question-and-answer game?"

"What kind of game are you talking about?"

"I ask you a question. If you don't know the answer, you pay me a quarter. Then, if I can't answer your question, I'll do the same."

"Ted," Kathy said with a yawn, "I think I'd rather take a short nap."

"Oh, come on. I'll tell you what. If you can't come up with the right answer, all you have to do is pay me a dime. But if I don't know the right answer, I'll still pay you a quarter!"

Kathy thought for a moment before answering. "Is this a tease or do you think you are some kind of smart-ass computer programmer?"

"It's a tease."

"All right. But just one go-around. Is that a deal?"

"It's a deal. Here's your question. You told me once that your mom and Dan Archer became lovers when you were four."

"That's right."

"Did your mom ever have other lovers?"

Without a word, Kathy reached into her purse, pulled out a dime, and handed it to Ted. Then, with another laugh, she looked at him and said, "Now it's my turn. Right?"

Surprised at Kathy's refusal to answer his question, Ted nevertheless took the dime and put it in his pocket.

"My turn?" Kathy inquired again.

"Go ahead," Ted responded, clamping his lips in a tight grimace and looking serious.

After a brief moment of reflection, Kathy asked, "What's the difference between a Democrat and a Republican?"

"That's easy, Ted answered with a laugh. A Democrat is a Republican with a guilty conscience."

"Not bad, Ted. But that's not the answer I have in mind."

After several additional tries, Ted asked for a hint.

"No way, Ted. This is your game, not mine."

"Okay. You win. Here's your quarter," he said as he struggled to extract two dimes and a nickel from his pants pocket.

Kathy politely took the change and put it in her purse. Then, covering another yawn with her hand, she said, "Well. I guess that's it."

"Hey. You can't quit yet. What's the answer?"

Without a word, Kathy opened her purse and handed back a dime, saying, "The game is over, Ted. I'm ready for a snooze."

"I've been had," Ted said in frustration for having been duped so easily.

Thirty minutes later, the forested terrain through which they had been driving was replaced by gently rolling hills and grassy pastures.

Aware that the park was only a short distance ahead, Ted eased up on the accelerator. Barely awake, Kathy felt the pressures of the past few weeks ebb away. With a sigh, she looked at Ted and smiled, grateful for the tranquility of the moment. Attentive to the smile, Ted reached out and squeezed her hand, stirring warmth in her of a different sort. Suddenly, the scenery faded as Ted's presence filled her. Such a wonderful man. Quite a contrast to Scott, a lightweight who always kept at a safe distance from issues she found so urgent. Or was Scott simply slower to commit himself to activities of which he had little knowledge? As for Ted, their relationship had strengthened over the past few years, due in part to their respect for a common vision. Was there something deeper as well? She greatly admired Ted's energy and intellect. And yet, his 'all work and no play' attitude made her question what living with him would be like if they ever decided to do that. She'd known other men in her life – a few, quite closely. But none had ever met her expectations of what she wanted in a life-long companion. Tired of being disappointed, she eventually immersed

herself in her job and her political activism.

"You're rather quiet," Ted said, interrupting Kathy's meditative reflection. "What's on your mind?"

"Not much. The view is lovely. I sometimes forget how much I miss the real countryside."

A short while later Ted swung into a large park area. Out of the car, the two of them walked to the edge of the nearby bluff and then descended a steep set of stairs to the lighthouse below. At the very tip of Point Reyes, they enjoyed the feel of sea spray against their faces. Kathy wiped her brow with her hand and then said in a husky voice, "This is so beautiful. I love it here. Just the two of us, together."

"I feel the same way," Ted said as he put his arm around Kathy's waist and gave her a gentle hug. "You know, Kathy. We really should spend more time together."

"It's not that difficult, you know. All it takes is commitment."

Back at the top of the stairs, Ted saw an arrow that pointed toward Drake Beach. "Look. There's a trail. Let's take it."

When they reached the shore, Ted and Kathy watched three rubber-suited kayakers maneuver their slim boats to the very edge of the breaking waves in a coordinated effort to ride them to the beach. A few yards away, a mother and father helped their young child build a castle in the sand. Suddenly, a series of strong wind gusts swirled down on the family forcing them to scurry toward the shelter of a tall cliff.

"Hey, Kathy," Ted shouted against the rising wind. "I think it's time to go."

As they walked back to the car, Kathy suggested that rather than head directly home, they have an early dinner at the Abalone Inn a few miles away.

"You want to talk about the Department of Energy report?"

"I'd rather relax now and leave that discussion for later. I'm tired. This is the first break I've had in a really long time."

"Okay. A quiet dinner sounds lovely."

Over seafood pasta and a glass of chardonnay, Ted and Kathy talked

about the end of the Cold War and what it meant for their political work. Then, noting a slight frown on Kathy's face, Ted again asked what was on her mind.

"Us," she answered. "We've been political partners for a long time. But politics isn't everything. It simply isn't." Then, to Ted's surprise, Kathy's face suddenly crumpled. As she reached for a napkin, he saw a small tear trickle down the side of her face. More than a little shocked by the depth of her emotion, he reached for her hand, and said, "You know that I care for you Kathy. You know that, don't you?"

Kathy, slightly surprised by Ted's remark, wasn't sure how to respond. On rare occasions, they had expressed real affection toward one another, both emotionally and physically. But always there was more work that needed to be done. More demonstrations. More people to reach. More coding at the computer center. Could the demise of the Cold War allow them the time needed to deepen their own relationship? She didn't know.

"What do you want most right now?" she asked as she looked deep into Ted's eyes. The answer was not what she expected.

"You are right, Kathy. The world is changing. But perhaps in different ways than we think. I read what Helen Caldecott said at the debate about depleted uranium, 'smart missiles,' and the Persian Gulf War. There is a group being formed at MIT that is looking critically at post-Cold War weapons. They also work closely with computer scientists at the University of Illinois, helping them with a project they call the 'World Wide Web.' I think it will revolutionize information flow. The guys at MIT want me to join them. Needless to say, I'm very interested."

"You mean move to Cambridge?"

"Yes. And if I accept, would you like to move there too?"

"When?"

"Whenever I move. Probably this fall."

"Ted, I can't just pick up and leave my world for Cambridge. What would I do there?"

"Kathy, we are more than good friends. We're a team," Ted responded. "I need you."

"Why do you need me, Ted? Why?" Kathy answered, and then burst into tears. For the remainder of the dinner and drive home, both remained largely silent, caught up in their own thoughts. Finally, parked in front of Kathy's apartment, Ted asked, "Shall we go to your apartment and talk about the DOE report?"

"Not now, Ted," Kathy responded, trying as best she could to reduce her frustration over their earlier conversation. "Maybe tomorrow. That was a lovely time we had together at Point Reyes. I'm sorry it ended so poorly. Anyway, here is a small gift for you."

As Kathy got out of the car and climbed up the steps to her apartment, Ted looked down, opened his hand, and smiled. Lying in his palm was a shiny dime and a nickel. Leaning out the car window, he asked, "When am I going to learn the difference between a Democrat and a Republican?"

"Soon," Kathy answered with only a trace of a smile. Opening the door to her apartment on the second floor, she took one look around, then sat down on the couch, her face pale with fright. "Oh my God!" was all she could say over and over again.

The changes in the living room were subtle. Her notebooks, once stacked on her desk in a haphazard manner, were now arranged in a slightly more orderly fashion. The kitchen drawer she had left open at noon was closed. And her books on the shelf at the far end of the hall were more upright than she had seen them in months. Already aware of the answer, she ran to the bedroom. Under the edge of her foam mattress, she looked for her copy of the report taken from Professor Spellman's briefcase. It was gone.

Chapter Six

Wednesday, August 12, 1992

At seven-thirty in the morning, Ted Thorson had just finished breakfast when the phone rang. It was Kathy, her voice full of concern. "Ted, do you have the copy of the Cannikin papers I gave you on Sunday?"

"Of course. I'm ready to talk about them whenever you like. Why are you asking?"

"Yesterday, while we were at Point Reyes, someone broke into my apartment and searched through my things. They found the copy. The papers are gone."

"Are you sure?" Ted asked in surprise.

"Yes. Can we get together soon?"

"How about lunch at the student union?"

"Okay. And Ted. Bring your copy with you."

"I will."

Immediately after he hung up, Ted opened the file cabinet next to his desk and reached for the folder where he had placed his copy of the Cannikin papers two nights ago. It wasn't there. Had he put it in another folder by mistake? No. Had he put it somewhere else? No. After a thorough search, he sat down at his desk and tried to think. Obviously, Kathy's problem was no longer hers alone. He wasn't exactly sure who had taken the documents, but he had a good idea. On further reflection, he realized what he had to do. He took a handful of dimes and quarters from his top dresser drawer, went down the stairs to the street and slipped into a phone booth a block away. He dialed a long distance number and waited for an answer. 'Come on,' he said to himself as if his words could force the other person to pick up the phone. Eventually, there was a response.

"Hello," a male voice said at the other end of the line.

"Hi. This is Ted in San Francisco. I have a problem. Can you call me from a pay phone at this number?" he said, reading the information printed on the telephone dial in front of him.

"Give me five minutes," the voice answered. After a short wait, Ted heard the phone ring, followed by a question. "Exactly what is the problem?"

Ted summarized the substance of the papers Kathy had given him and the fact that both copies had disappeared. After a long pause, the man said calmly, "It sounds like a stalemate to me. Without the papers you can't prove what you know. But it's not in the government's interest to publicize the theft. My guess is, nothing will happen. If I'm wrong, let me know immediately. Also, if you can't reach me by phone, use our new encrypted email."

"How do you feel about Kathy using that capability?"

"You're calling the shots on this one. As long as you feel clear about it, go ahead," the man said and then hung up.

Back in his apartment, Ted opened the filing cabinet, took out a floppy disk, and put it in his jacket pocket. He then locked the door and drove to his office thirty minutes away. At noon, tense with worry, he arrived at the student union where Kathy was already seated. "Do you have the papers?" she asked. Then, seeing the drawn expression on his face, said, "Oh my God. Your copy is gone, too!"

"I'm afraid so."

"How did anyone know I had them?"

"Might you have left the last page in the copy machine?"

"No. I was very careful about that."

"Did you tell anyone else about them?"

"Only you."

"Then there's only one answer. It's the FBI."

"Why do you say that?"

"My apartment has to be bugged. The only reference in your phone call was that you wanted to see me about something important."

"Oh, Ted. I'm so sorry about this. What do we do now?"

"I'm not sure. On the assumption the FBI has the papers, they will immediately get in touch with Professor Spellman who, in turn, will contact the scientists at Livermore. Livermore will then check with the powers that be in Washington before taking any further action. At the moment, all we can do is sit tight and wait."

"Ted, I'm scared."

"So am I. From now on we have to be extremely careful in our communications. But the situation isn't all bad. Livermore knows that without the Cannikin papers, the press won't print the story. At the same time, the lab is not about to tell the world that American construction workers have died because of their mistake. So, they may decide to keep the whole matter quiet."

"And in the process, the workers continue to get sick without being told why. That's not fair to them."

"No, it isn't. But your future is at stake as well."

"I know."

"I have a friend in the construction union. Perhaps we can find a safe way to pass the information on to him."

"Do what you think is best." Then, after a slight pause, Kathy continued. "Ted, there is something else I need to tell you. I got a telephone call yesterday from Tom Manning, the director of the Denali Institute at the University of Alaska in Anchorage. They have a full-time library position open at the Institute and he's invited me to come up for an interview. Now that the FBI is on my case, who knows how much longer I'll have my job at the Bancroft library."

"My God, Kathy," Ted answered, shocked at the news. "When is the interview?"

"Monday. I have a week vacation time and plan to fly north on Saturday."

"You might actually move to Alaska? I can hardly believe it."

"I'm not sure I believe it myself."

"Kathy, we need a confidential way to keep in touch. I have a friend at MIT who helped design an email encryption program he says is

unreadable by a hacker, an FBI agent, or even the National Security Agency. After lunch, let's go to the computer lab and I'll show you how to use it."

"Okay."

A half hour later, the two friends entered Ted's office at the lab. Seated in front of a keyboard and monitor, Kathy watched as he signed on to the university server. Then, turning to her, he said, "We'll begin with a plain text message you want to send to me. The first thing you need to do is scramble it into cipher text so no one else can read it. Then, when I receive it, I need to turn it back into plain text by decrypting it."

"What does encrypted text look like?" asked a bewildered-looking Kathy.

"It looks like gibberish. Encryption takes plain text characters and turns them into ones that are completely unreadable. An algorithm is used to scramble the message. Actually, there are two types of cryptology – symmetric and asymmetric. In the symmetric approach, one key is used to scramble and unscramble messages. With asymmetric crypto, two keys are used, one to scramble and the other to unscramble the message. The latter method is called public-key cryptography."

"Slow down, Ted. This is too complicated for me. Which one are we going to use?"

"For the moment, we'll use the asymmetric one. It's simpler. We can change to the more complex one later on. First, you need to choose a password. Choose a combination of characters that you can remember easily, but one that others can't comprehend."

"Ted. Is this absolutely necessary?" Kathy asked in a voice fraught with frustration.

"Yes."

"All right, I'll choose an Iñupiaq word."

"Good. To be even more secure, add a number and symbol to it." Ted then reached into his jacket pocket, removed a floppy disk, and inserted it in the computer. "The encryption software is on this disk. Look. Here is where you type in a password. Go ahead and do it."

After a brief moment of reflection, Kathy typed in an Iñupiaq word. When she finished, Ted continued, "You will need this floppy to encrypt your messages. So keep it well hidden."

"How do I decrypt your message?"

"We each have a key. Watch. I'll explain."

Over the next twenty minutes Ted and Kathy sent messages back and forth. When they finished, Ted nodded and said, "You've got it. When you have time in Anchorage, load this floppy on to whatever computer you have access to, sign on to the electronic mail, and send me a message. If everything goes well, I'll decrypt it and respond accordingly. Can I take you to the airport on Saturday?"

"Sure. The plane leaves at eleven-thirty. "

"Fine. I'll pick you up at ten."

After Kathy placed the disk and notes in her briefcase, she and Ted headed toward a side exit of the computer lab. Reaching Sather Gate, they quickly embraced and then parted. Focused on their goodbyes, they were unaware of the short stocky man with dark-rimmed glasses who had followed Kathy's every move shortly after she told Ted what she had removed from Dr. Spellman's briefcase.

Three days later, Scott Jamison entered the patio door of the Café Mistral to see Serena seated at a nearby table. She greeted him warmly. "Hi, Scott. How are you doing?"

"Great. What's up?"

"I spent part of Friday helping Kathy pack her stuff."

"Where is she headed?"

"She caught a flight this morning to Alaska. She wanted to say goodbye but you weren't around. So she asked me to tell you she was sorry not to see you before she left."

"What was the hurry?" Scott said, surprised at Kathy's sudden departure.

"She has a job interview at an environmental research institute in Anchorage. By the way, did you hear the news about the Livermore

bomber?"

"What news?"

"It's in today's paper. Here. I'm finished with mine. You can have it," Serena said handing him a copy of *The San Francisco Chronicle*.

"Thanks." Then, after a short pause, he looked at the tall blond-haired woman seated at the table and said, "Serena. How would you like to join me for dinner sometime? Maybe go to a movie afterwards?"

Amused, Serena answered, "Now that Kathy's left town, you want to explore the waterfront. Is that it?"

"Not really. I just thought it would be nice to eat dinner together. I'm also writing an article about the antinuclear movement and could use some help."

"Dinner sounds like fun. Here is my number. Give me a ring." Serena said and wrote her telephone number on a napkin. "As for an interview about your article, I'll have to think about that. Now, I gotta go. But do call. I like the movies. Haven't been to one in a long time."

After pouring a cup of coffee for himself, Scott sat down at her table and searched through the newspaper for the article on the Livermore bomber. He found it on page three.

San Francisco Chronicle, August 12, 1992

*U.S. OFFERS IMMUNITY TO SUSPECT IN BOMBING AT
NUCLEAR LABORATORY*

A Utah miner charged with setting off a car bomb just inside the fence of the Lawrence Livermore National Laboratory was promised immunity from prosecution if he would show a federal agent the location of another bomb site near a government nuclear facility outside of Las Vegas.

After he received immunity, Thomas Fried led federal agents to a cache of explosives in a remote region of southeastern Utah. These included 36 sticks of dynamite, 50 rounds of ammonium nitrate fuel oil explosive, and thousands of feet of fuse hidden in an abandoned mine. The agreement came at a hearing

before U.S. Magistrate William Sebring, who had previously ordered Fried held without bail on charges stemming from the Livermore bomb.

The Livermore laboratory is a major center for the design of U.S. nuclear weapons. In mid-afternoon of August 6th, a dynamite bomb demolished a car in a Livermore parking lot, scattering debris for 50 yards. No one was injured. Also found in the car was a metal box of contaminated soil apparently taken from a nuclear test site in Nevada. Thomas Fried admitted calling the San Francisco Associated Press the next day to accuse the Nuclear Liberation Front, a previously unknown organization, of setting off the Livermore bomb. He also told the newspaper the Front wanted to return the contaminated soil to its original source as an expression of its opposition to nuclear tests. The FBI stated later that it was previously unaware of this terrorist group and that quite probably, Thomas Fried is its only member.

Fried's lawyer, Bryan Hopewell, added that soon after the bomb exploded, Fried came to see him, reported what he had done, and said he wanted to surrender. Hopewell then contacted a Justice Department official in Washington and James Folstead, head of the FBI's counter-terrorism unit in San Francisco to seek an immunity agreement. Both Hopewell and the FBI refused to identify the specific location of the future target.

Finished with the paper, Scott shook his head in disbelief. The Livermore bomber was given immunity from years in prison because he told the FBI the location of another cache of bomb-making materials in Nevada? To offer immunity to such an individual was strange, to say the least. Seated in the same room where he and Kathy first met, he remembered her theory that the FBI was behind the Livermore bombing and Ted Thorson's story about FBI agents infiltrating the environmental organization, Earth First. Might the Bureau actually be responsible for the Livermore bomb? It was beyond Scott's comprehension. And yet the question remained, which

of the two would be the primary beneficiary of such a terrorist act? The FBI or a disgruntled miner?"

That evening, as the sun set against the cloudless August sky, James Folstead sat next to his wife Helen on the deck of his Lafayette hillside home and looked down at the town's reservoir far below. "How did your day go, dear?" his wife asked while handing him a small bowl of potato chips.

"Busy as usual."

"You don't usually work so late. Was this something special?"

"You could say that, I guess," Folstead acknowledged, taking a sip from his dry martini.

"I read in today's paper about your success in the Livermore bomb case. Are you pleased with the way it turned out?"

"Basically, yes. The man was a weirdo," James Folstead answered and then added quietly. "I'm glad we found him."

"Was he the only member of the National Liberation Front?"

"It was just a name he made up to draw attention of the press. The real reason for the bomb was his anger over atomic tests in Nevada. He claimed radioactive fallout from those tests made his parents sick and wiped out their farm."

"Do you think that's true?"

"It's possible. A US House Subcommittee report acknowledged some time ago that radiation from the site did harm Utah farmers and their animals."

"That's a shame, dear. I hope nothing like that ever happens again." As Helen rose from her chair, she kissed her husband lightly on the lips, and then winked as she felt his hand slide along her thigh in expectation of things to come. After a quick hug, she added, "You've had a long day. Why don't you relax here on the deck while I get dinner on the table?"

"Thanks honey. I'd like that."

As his wife went inside, James Folstead took another sip of his martini. Helen was right. It had been a long day. And not just today.

His greatest concern stemmed from the meeting two days ago in which he and Bill Gregory were briefed by the deputy director about the stolen copy of the Cannikin report and the fact that Kathy Kaluk should be kept under active surveillance for as long as she remained in Berkeley. Which would be brief, he was sure. During an interview with an assistant director of the Bancroft Library, Gregory informed the woman of Kathy Kaluk's copying Professor Spellman's personal papers. Although Gregory kept most of the details to himself, it was clear from the director's response that Ms. Kaluk's position would soon be vacant.

Ted Thorson, too, needed to be kept under surveillance. However, since he was only indirectly involved in the incident and no longer had copies of the Cannikin papers, it was unlikely he would make any public statement that might jeopardize his or Kathy's future employment. And even if he did, the newspapers wouldn't print the story without a confirmed source. Thus, it seemed unlikely that the Cannikin issue would ever be aired. Unless, of course, the Department of Energy decided to bring it to the attention of a federal grand jury.

Still, given that Kathy Kaluk might move back to Alaska, he should at least send Special Agent Danon Wentworth a brief note describing what had happened here. But there was no hurry. Tomorrow morning he had to drive out to Livermore and discuss with Detective Sam Martin how best to deal with future demonstrations at the laboratory. Back at the office that afternoon, Bill Gregory planned to brief him on new candidates to replace the informant, Serena, who was leaving Berkeley at the end of the year. And in the evening, he promised Helen he'd take her to the movies. He hoped it would be a comedy. He definitely needed a few good laughs.

Interlude

Monday, September 7, 1992

Russell Whitehorse finished his last sip of breakfast coffee, gave his wife an affectionate kiss, and then climbed in his car and headed for downtown Anchorage. He and Connie had spent a lovely weekend together at their cabin in Seward, walking along the beach, taking in the sunset, and discussing plans for the future. At forty-six, Russell was too young to retire from the Bureau. Yet his twenty years with the FBI left a lot to be desired. Raised on the Navaho Indian reservation in Arizona, he never imagined he would become a 'G-Man,' not to speak of living in far-off Alaska. After graduation at a nearby college, he enlisted in the Marine Corps and spent three years in Vietnam as a criminal investigator. Shortly after his discharge, he was recruited by the FBI, taught the latest counterinsurgency techniques at one of the Bureau's field centers in Virginia, and then sent to South Dakota to penetrate the 1973 American Indian Movement uprising at Wounded Knee.

It was an assignment he swore he would never accept again. For the first time since the Civil War, the Pentagon dispatched US Army troops in a domestic operation with orders to "shoot to kill." His primary task was to provide the Oglala Sioux Tribal Council's roving goon squads with rifles and ammunition. Only later did he learn that AIM's proposed mutual withdrawal of forces from the Wounded Knee Reservation had been rejected by the Justice Department in favor of maintaining an FBI roadblock to keep food, medicines, and other needed supplies from the Indian militants.

Furious at the Bureau's response to the siege, Russell decided to resign. To his surprise, his decision was met with an offer of promotion and the opportunity to join the white-collar-crime unit at the FBI headquarters in Washington, D.C. After a long discussion with Connie, he changed his mind. Dealing with criminals seemed a lot better than

infiltration of native organizations opposed to government policies on Indian rights to self-governance. A decade later found him in Anchorage, finally freed from the bureaucracy that characterized so much of the capital city. Far better to live in Alaska, he decided at the time, drawn to its frontier spirit, cultural diversity, and incomparable beauty.

At the FBI headquarters on Northern Lights Boulevard, Russell asked the secretary if he had any letters in the morning mail. "Two," the woman answered. There is also one for Danon Wentworth. Do you want to open it?"

"Sure." After serving in the criminal division for twenty years, Special Agent Damon Wentworth had retired and left the state. Russell was assigned his cases on a temporary basis until a new agent arrived.

Seated at a small desk in his office, he looked over the mail. The one for Wentworth immediately drew his attention. It was from James Folstead in the FBI's San Francisco office. The letter first thanked Wentworth for the information he had passed on to Ralph Obermiller concerning Susan Kaluk and her daughter, Kathy. The agent went on to say that Kathy Kaluk had recently left California to accept a position at the Denali Institute in Anchorage. A month before her departure, she copied classified documents from a UC-Berkeley physics professor's briefcase containing scientific data on a 1971 atomic bomb test in the Aleutian Islands. Due to a complex set of circumstances that included a request from the Atomic Energy Commission not to publicize the event, the woman was not charged. However, given her return to Alaska, Folstead thought it wise to inform the Anchorage office.

Whitehorse tried to remember what Wentworth had told him about Susan Kaluk. Unsure of his memory, he went into a back room and opened a file cabinet marked Inactive. Under the letter K, he found what he was looking for. Back at his desk, he opened the file and began to read.

The bio was brief. Born in Concord, Massachusetts in 1931, Susan Kaluk was the only child of well-to-do parents, highly regarded as leaders in that historic community. After graduation from Wellesley

College, she decided to seek a different kind of life far removed from the affluent world where she had grown up. She applied to the Bureau of Indian Affairs for a position teaching English in Alaska and was offered a post in Point Hope. While there she married an Eskimo pilot, only to lose him in a whiteout five years after their marriage and three years after Kathy's birth. The FBI's first contact with Susan Kaluk occurred in 1959 when she, along local Iñupiat village leaders, wrote letters to senators and congressmen threatening to take action on their own unless the Atomic Energy Commission abandoned its plan to blow up a harbor at nearby Cape Thompson. Four years later, she moved to Anchorage to accept a job with the environmental organization, *Arctic Action*, as a researcher and free-lance writer.

The remaining documents concerned Susan Kaluk's activities at Fort Greely. Included was a brief dossier describing her arrest by the Fort Greely Military Police for the illegal removal of plant roots from the bank of a small creek that ran through the military base; a letter from Ms. Kaluk requesting a copy of her file through the Freedom of Information Act; a copy of a search warrant for her apartment; a newspaper clipping; and, finally, a hand written surveillance report. Her FOIA request was immediately rejected for reasons of national security. The newspaper clipping was from the September 21, 1984 issue of the *Anchorage Daily News*.

WELL-KNOWN WRITER MISSING AFTER CAR ACCIDENT

Susan Kaluk, 53, social activist and controversial author, is presumed dead after an accident two nights ago on an isolated stretch of the Richardson Highway near Delta Junction. According to Lt. Samuel Pearson of the Alaska State Police, Susan Kaluk's station wagon apparently slipped on a patch of ice while rounding a curve. A local resident, who observed the accident from her cabin a short distance away, said Ms. Kaluk was being closely followed at the time by a dark blue Ford sedan. Calling the state police, she informed them what had happened. When an officer arrived, he found the station wagon had crashed through a wooden guardrail and sunk below the icy surface of the Tanana River. As of today, the body has not been found. Anyone with knowledge of a dark blue Ford driving

in the vicinity of Delta Junction on September 19th is encouraged to contact the state police as soon as possible.

The reason for Susan Kaluk's presence in Delta Junction at the time is unclear. However, it is known that she had visited the area on several occasions to gather information on environmental problems at the Fort Greely military base southeast of town. Major William Hardwick, Public Relations Officer at the base, had no comment when asked if he was aware of the author's investigation.

Ms. Kaluk's husband, Ronald, a pilot for the Naval Arctic Research Laboratory at Barrow, predeceased her. Her daughter, Kathy, who resides in Berkeley, California, is the one remaining relative. In lieu of flowers, friends are asked to make a contribution to the environmental organization, Arctic Action, which is establishing a memorial fund in Susan Kaluk's name.

The final item in the folder brought a whistle of surprise from the lips of Russell Whitehorse. It was a handwritten surveillance report dated the evening of Susan Kaluk's death. Curious that it had not been typed up in the usual fashion, Russell Whitehorse leaned forward in his chair and placed the faded paper under the light of his desk lamp. What he read brought back the horrors of his first assignment with the Bureau.

Subject exited the Delta Junction library at 8:30 pm, climbed in her station wagon and headed toward the Richardson Highway a short distance away. As I prepared to follow, the driver of a dark blue Ford sedan parked nearby started his engine and swung in behind the station wagon. Keeping a safe distance, I tracked both cars out of town. At a sharp bend in the highway, the Ford suddenly sped up in what appeared to be an effort to force the station wagon off the road. To avoid a collision, the subject veered to the left, lost control, crashed through a guardrail, and disappeared. The Ford slowed down briefly, and then continued on without stopping. Due to the darkness, I was unable to read the license plate of the second car. Following instructions given to me prior to the surveillance, I immediately radioed in what I had observed

and left the scene.

Shocked, Whitehorse closed the file, stood up, and walked over to the window. Glancing outside, he observed four primary school children laughing at the antics of a fifth as they walked along the street. The innocence of youth stood out sharply against the sordid details of what he had just read. Would it ever end, the half-truths, distortion, and outright disregard for justice that pervaded the world of surveillance? Why didn't the FBI agent stop the driver of the blue Ford? Russell had no idea. But in his heart, he knew the Bureau's lack of follow-up was wrong. Whether he had a role to play in righting that wrong, Russell couldn't yet say.



FORT GREELY

[Chapter 7](#)

[Chapter 8](#)

[Chapter 9](#)

[Chapter 10](#)

[Chapter 11](#)

[Chapter 12](#)



Part Two

Fort Greely

July-August, 1993

"In essence, we are conducting an uncontrolled experiment with the planet."

Cheryl Simon Silver & Ruth D. Defries,
One Earth, One Future
National Sciences Press, Washington, D.C.[1992]

External Reviewers Please Note:

Adobe Acrobat and a password are required to read chapters in Part II: Fort Greely.

If needed, please contact the author for the latest password

Embedded Secure Document

The file http://normanchance.com/betrayal/novel/fortgreely_web/greely_partII.pdf is a secure document that has been embedded in this document. Double click the pushpin to view.





Finale

"I'm running out of demons. I'm down to Kim il Sung and Castro"

General Colin Powell, Head of the Joint Chiefs of Staff,

in a 1991 speech to the U.S. Congress

[Please Note: The Finale is still in process.]



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[Cannikin](#)

[Fort Greely](#)

[Project Chariot](#)

[Maps](#)

[Publications](#)



Bibliography

Please Note: Sound and video films require a media player.

Introduction

The history behind the following files begins in the 1950s, after the U.S. Atomic Energy Commission decided to detonate a series of nuclear bombs in Alaska in an effort to demonstrate the peaceful uses of atomic weapons. With the development of Cruise missiles in the 1960s and 70s, space became a potential arena for future biological, chemical, and nuclear weapons development. This was followed a decade later by President Ronald Reagan's 1983 'Star Wars' speech to the nation announcing a plan to render "nuclear weapons impotent and obsolete." As Reagan told the American people at the time, a missile shield would be built creating an impenetrable 'astrodome' over the continental United States.

In the following year, accompanied by massive press coverage, an interceptor rocket homed in on and destroyed its Minuteman missile target, leading the Pentagon to state that the test proved Star Wars was a viable form of defense. Over the next fifteen years, the project consumed \$55 billion. However, following the implosion of the Soviet Union in 1991, the Strategic Defense Initiative [SDI], fell on hard times. That year, Congress cut the SDI budget for the first time, reducing funds by twenty-three percent. Production of new missiles was also seriously behind schedule and equally over budgeted. As one critic expressed it, the whole scenario was "unblemished by success." Furthermore, in an address to Congress that same year, General Colin Powell, head of the Joint Chiefs of Staff, complained that "I'm running out of demons. I'm down to Kim il Sung and Castro."

Nevertheless, with active support from a largely conservative Congress, money continued to be appropriated. Ironically, Star Warriors in and outside the government received one of their most serious setbacks in 1995 from a surprising source—the CIA. Four years after General Powell's speech, Director Robert Gates reported to President Clinton that no country other than the declared nuclear powers will be capable of developing a ballistic missile in the next fifteen years that could threaten either the United States or Canada. This led to Clinton's veto of a defense

appropriation bill mandating the deployment of a missile defense system. Other critics added that an effective shield was impossible to achieve. That the long-range cost to the nation would be astronomical. And finally, that the plan was proactive as well as reactive—and thus, the potential source of a new arms race.

Threatened, conservative politicians and defense experts highlighted new dangers in an effort to shape public opinion in support of an updated missile program. Only by recognizing these dangers, they said, could a sound national defense be constructed. Putting together a dazzling public relations offensive, they went on the TV talk show circuit, demonstrating graphically by moving picture film and satellite photos the menacing potential of a country vulnerable to a nuclear missile attack. Enjoying the benefits of a booming economy, most Americans appeared oblivious to the projected threat. In an effort to counter this lack of concern, the new Star Warriors called for another appraisal culminating in the 1998 recommendation of the Rumsfeld Commission, named after the former secretary of defense, Ronald Rumsfeld. Directly criticizing the CIA report, Rumsfeld stated that the threat of an Iranian, Iraqi, or North Korean ballistic missile attack on the U.S. was "broader, more mature, and evolving more rapidly than has been reported in estimates and reports by the intelligence community." To no one's surprise, a short while later, the Republican controlled Congress gave the Pentagon an additional \$1 billion to pursue a National Missile Defense program [NMD]. With the arrival of Republican George W. Bush as the first US president in the new millennium, a massive multi-billion dollar commitment was undertaken to finally implement the program. Still, many Americans remained unconvinced of a serious ballistic missile threat. They were more troubled by America's growing tensions with China and its expanded military ties with Russia. To supporters of the National Missile Defense program, this was unacceptable. Greater substantiation was clearly needed. Then came the terrorist attack on the World Trade Center on September 11, 2001.

The files that follow offer a significant insight into the history of the United States' biological, chemical, and nuclear missile weapon development in Alaska - as well as its recent reincarnation reflected in the revived National Missile Defense program in that region.





Cannikin

[Summary Report on Cannikin Test \[1971\] Press Release](#)

[Cannikin Test film \[1971\] U.S. Department of Energy](#)

[Exposure of Contract Workers - \[A brief excerpt discussing Alaska Laborers Union workers\]](#)

[Impact on Native Population - Human Radiation Studies: The Early Years: Oral History of Biolochemist John Randolph Totter \[A brief Excerpt\] \[1995\] U.S. Department of Energy](#)

[Background Data - U.S. Department of Energy](#)

[Declassified DOE Document Requesting support for underground test of the Spartan Missile warhead](#)

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SURFACE OF AMCHITKA ISLAND IN THE ALEUTIAN CHAIN OF ALASKA AT 5 00
P.M. CMM EST CMM NOVEMBER 6 CMM 1971 CLM
SCIENTIFIC PROGRAM

THE ATOMIC ENERGY COMMISSIONS LAWRENCE LIVERMORE LABORATORY CMM
WHICH WAS RESPONSIBLE FOR WEAPON DESIGN AND WAS IN CHARGE OF THE
SCIENTIFIC ASPECTS OF THE TEST CMM REPORTED THAT ALL CLASSIFIED
EXPERIMENTS DESIGNED TO MEASURE THE DEVICE PERFORMANCE RECORDED
DATA CMM AND THAT PRELIMINARY EXAMINATION OF THE RECORDS INDICATED
THAT THE DESIRED INFORMATION WAS OBTAINED. THE DATA RECORDED
ON FILM AND TAPE WILL REQUIRE DETAILED ANALYSIS. WORK HAS BEGUN
TOWARD DRILLING INTO THE RADIOACTIVE MELT IN THE DETONATION AREA TO
OBTAIN SAMPLES OF THE MELT FOR RADIOCHEMICAL ANALYSIS AT THE
LABORATORY AT LIVERMORE CMM CALIFORNIA. IF THE WORK PROCEEDS ON
SCHEDULE CMM THE DRILLING PROCESS IS EXPECTED TO BE COMPLETED BY
SPRING 1972. THE ANALYSES OF THE MELT ARE REQUIRED TO EVALUATE FULLY
THE PERFORMANCE OF THE SPARTAN WARHEAD WHICH WAS TESTED.
RADIOACTIVITY

THERE HAS BEEN NO DETECTABLE RELEASE OF RADIOACTIVITY TO THE
MARINE OR SURFACE ENVIRONMENT AS A RESULT OF CANNIKIN. MEASUREMENTS
WILL CONTINUE FOR A NUMBER OF YEARS.

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Committee staff.)

Lynne Stumbridge of the Hanford Education and Action League, who spoke at the Committee's San Francisco meeting, noted that the original release of information on the dietary studies said that students had ingested radioactive substances, but that a later correction indicated that the word "no" should have been inserted before "radioactive substances." She asked for copies of the Committee's document request on these studies as well as any DOE responses, and offered to consult on possible additional requests.

Lois Camp, who also spoke in San Francisco, corroborated stories of men in white coats coming into classrooms and painting students' throats -- she presumed it a thyroid study of some sort. She noted that she and other classmates had deformed fingernails, and Battelle supplied the public schools with chemicals to fix them.

Iris Hedmond recalled that Battelle brought a mobile whole-body counter to the local school and collected data on students' diets. She said she thought the then-schoolchildren would be relatively easy to find and noted that some had received certificates for their participation in this study. (A copy of the certificate obtained by staff is attached to this memorandum.)

Amchitka Island

Bev Aleck of the Alaska Laborers Union described the series of underground and below sea-level tests that occurred at Amchitka Island in Alaska's Aleutian Islands. She said that dozens of workers who dug and plugged leaks in the test tunnels died of leukemia and other cancers from radiation exposure. She said that documents describing their exposures remain classified. She said that because workers were employed by a contractor rather than the federal government, they were not covered by legislation that established the presumption that certain cancers were caused by exposure to atomic testing.

Veterans

Kathy Jacobovitch said her father had been exposed to radiation as part of his decontamination work [at Bremerton Naval Shipyard,] and was studied afterwards. She attributed her medical conditions (including lupus) to his radiation exposure. (She said she was "a fetus" during the period he was being exposed.) She reported no difficulty in obtaining his medical records. *David Vanderbilt* testified to his participation in Operation Plumbbob at the Nevada Test Site.

Radiation Therapy

Joanne Watts reported that she had been treated in 1945 at the age of 15 in St. Luke's Hospital in Denver. She had a blood condition; the doctor was uncertain if it was leukemia, but recommended radiation treatments to the leg bones to stimulate blood production. Her father consented to the controversial treatment, and her condition improved. She suggested that some of her medical conditions -- including ovarian cancer and fibroid tumors -- might be due to this therapy.

environment, as it speaks.

PALMITER: With the staff that we had there we covered the plankton, the benthic organisms both animal and plant, the jack rabbits on land, the deer, any cattle that were in the area, the other game fish. Wayne Hanson was very involved in the bird life. He was greatly involved in the studies on the Eskimos at Amchitka and Point Barrow and the sampling(?) of the lichens on the mountainsides there in Alaska to determine the concentrations of strontium and cesium and the pathway into the caribou and eventually into the Eskimo.

STANNARD: Maybe we should spend a little time on the Alaskan incidents. It's a lot easier to ask someone like yourself who's been there, was around when the work was done, and save me that much more reading. I, of course, know of the incidents. This was the sudden finding as a result of the Soviet tests?

PALMITER: Well, I would say yes, primarily. But any of the tests in the northern hemisphere would cause the deposition of strontium, cesium in the Finland, Norway, Sweden, Iceland, Canada as well as Alaska and the Soviet Union. I think it was a very unique situation and one in which the federal government could have caused more difficulty if we would have removed the Eskimos from such places as Amchitka because of the radiation.

STANNARD: Well, why was it so bad there?

PALMITER: I don't think it was necessarily bad there compared to other places, but it was a captured population of Eskimos you might say.

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CANNIKIN BACKGROUND

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*All of test insignificant except what device is for, i.e. what system.
Fall - possibility of test
ict: 1 -*

A. General

1. Yield and purpose: This experiment will test a device having a yield of less than 3 megatons which is essential to national security.
2. Location: Test site is located on Amchitka Island in the Aleutians about 1,400 miles west-southwest of Anchorage, Alaska. The nearest populations are located at Adak and Shemya, military bases each about 200 miles away.
3. Emplacement information: Buried at a depth of about 6,000 feet in a mined room at the base of 54-inch cased hole. Hole will be completely backfilled with stemming material.

Effects

1. Environmental statement: Draft statement prepared in compliance with National Environmental Policy Act of 1969 was circulated in June 1970. Revisions have been made based on comments already received. Revised draft will receive further comments as a result of informal public hearings in Juneau and Anchorage, Alaska during latter part of May 1971. Final statement estimated for publication by July 1971.
2. Earthquakes: Natural earthquakes larger than CANNIKIN occur frequently in the Aleutian chain. No significant damage will result from ground motion caused by the energy in the test itself. The possibility of triggering an earthquake with seismic energy comparable to or greater than that produced by the explosion itself is highly unlikely and in any event would only occur in the immediate vicinity of Amchitka. Foremost seismologists have asserted that an explosion at Amchitka will not trigger a large earthquake (i.e., same or larger energy than CANNIKIN) unless the occurrence of such an event is imminent, very near to Amchitka.
3. Tsunamis: Displacement of the sea floor is believed to be the cause of most large tsunamis. However, none of the natural earthquakes

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 BOX No: *A-30-7 74-9*
 FORGER: *Military Research & Application*
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which have occurred near Amchitka within the period of recorded history have disturbed the sea floor so as to cause a significant tsunami. Therefore, since rather severe earthquakes in the Amchitka area do not appear associated with tsunami generation, the probability of CANNIKIN generating a destructive tsunami by way of a triggered earthquake is considered less likely than the possibility of there being a large triggered earthquake.

4. **Volcanoes:** During the last three years only one significant volcanic eruption has occurred in the western Aleutian area although there have been many earthquakes. The line of active volcanoes running past Amchitka some 40 miles to the north has not been noticeably affected by such large earthquakes as the 1965 Rat Island earthquake with a magnitude of 7.8. Volcanoes which do occur are probably related to earthquakes. Since even large earthquakes are seldom associated with subsequent volcanic activity, the possibility of CANNIKIN triggering a volcanic eruption appears less than that of triggering a large and damaging earthquake. Where volcanic eruptions have occurred in the Aleutians near Amchitka those events have been in remote areas and have had little effect.
5. **Containment (radioactivity leakage):** Radioactivity will be trapped deep underground. The geology, depth of burst, and stemming are designed to assure successful containment. It is expected that the potential transport of radioactivity by groundwater will be very slow and inefficient and it will have virtually disappeared by radioactive decay before it can reach the sea.

C. **Bioenvironment**

1. **General:** The CANNIKIN test is expected to have no significant bioenvironmental effects with only minimal long-term impact.

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2. **Landscape:** No radioactivity contamination is expected. Main impact will be the occurrence of rock- and earthslides along coastal areas. One archaeological site which will already have been thoroughly documented may be damaged. Subsidence at surface ground zero will probably occur. It could be as large as 4,000 feet in diameter and up to 100 feet in depth.
3. **Birds:** Some bird nesting sites may be disturbed. Bald eagles and peregrine falcons not expected to be adversely affected.
4. **Freshwater fish:** Amchitka not commercially significant in this area. Threespine sticklebacks (a fish of extremely minor importance) may be lost in fairly large numbers. This would only represent a temporary loss. No significant damage expected to salmon.
5. **Saltwater fish:** No damage expected although a few fish may be lost because of overpressures or minor coastal earthslides.
6. **Sea otters:** Minimal effects, if any, predicted. Considerable experience gained from previous studies. AEC participated in sea otter transplants to other Alaskan locations and to Oregon, Washington, and British Columbia.

D. Logistics

1. Principal contractors:

- a. **Test:** Lawrence Radiation Laboratory-Livermore, Livermore, California
- b. **Technical Support:** EG&G, Inc., Las Vegas, Nevada
- c. **Construction:** Holmes & Narver, Inc., Las Vegas, Nevada
- d. **Mining:** Kiewit-Centennial
- e. **Communications:** Reynolds Electrical & Engineering Co., Inc., Las Vegas, Nevada

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2. Department of Defense: The DOD is cooperating actively in the conduct of this test. There will be a Military Task Force which provides both logistical and security support in the form of personnel and equipment (airplanes, ships, facilities on Adak).
3. Other agencies: Additional support and cooperation also being provided by Department of the Interior, Department of Transportation (United States Coast Guard, Federal Aviation Administration), and State Department.

Appendices:

- A. Chronological History
- B. Draft Environmental Statement

CHRONOLOGICAL HISTORY

- 1966 Initial briefings of Governor of Alaska and Alaskan Congressional delegation.
- February 1967 AEC officials met separately in Alaska with the Governor and state officials, representatives of the U.S. Bureau of Sports Fisheries and Wildlife, Federal Interior Field Committee, Alaska Federation of Native Associations, Bureau of Land Management, Commander in Chief of Military Forces, Alaska, news media and conservationist organizations. Response was generally friendly.
- July 1967 Two Seattle reporters escorted on visit to Amchitka.
- August 1967 Commander-in-Chief Military Forces, Alaska, briefed.
- January, 1968 Conference in Seattle with Alaska Commissioner of Fish and Game to arrange cooperation on sea otter transplant.
- June 1968 Representatives of Audubon Magazine, Reuters News Agency, and Anchorage newspapers were escorted on visit to Amchitka.
- September 1968 Trip arranged for Alaska Fish and Game Department employee to cover and photograph sea otter transplant activities on Amchitka.
- September 1968 National Geographic writer-photographer team escorted to Amchitka.
- September 1968 Meeting in Washington with Panel on Biological and Medical Sciences, Committee on Polar Research, National Academy of Sciences to brief on Amchitka Bioenvironmental Program.
- February 1969 NVO and EPA officials met with Alaska Health and Welfare officials for discussion of Amchitka activities and impact on Alaska.

APPENDIX A

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- May 1969 CBS television crew escorted to Amchitka.
- May 1969 NVO representatives visited news media and conservationist organizations in Fairbanks.
- June 1969 AEC top management team (Commissioner Costagliola and others) visited Governor Miller at Juneau and held public meetings in Juneau, Anchorage, Fairbanks, and Kodiak. Response generally favorable, except for some opposition in Kodiak.
- June 1969 Amchitka visit by member of Oregon Nuclear Coordinating Committee and reporter from New York Times.
- July 1969 NVOO Information Officer opened Alaska Information Office in Anchorage.
- July 1969 Three meetings in Washington with: Department of the Interior (including Undersecretary Train, Assistant Secretary Klein, and Fish and Wildlife Commissioner Moschella); staff of Alaska congressional delegation; and staffs of eight national conservation organizations. Provided details of predicted effects and scientific program planned on MILLROW.
- July-October 1969 Continuing contacts with Alaska news media, talks and film showings to civic and women's organizations, visits to other Alaskan cities and towns.
- July 1969 Dr. Ogle, Test Division Leader of LASL visited state officials in Juneau.
- August 1969 Escorted group of 15 Alaska news media reporters and photographers to Amchitka.
- August 1969 Meeting at Washington with Canadian government scientists on seismic and tsunami concerns.
- August 1969 NVO representatives met with Congressman Pollock to discuss Amchitka activities.

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September 1969	AEC exhibit during 10-day Alaska State Fair at Palmer, distributing thousands of copies of AEC literature, showing sea otter transplant and "Amchitka Revisited" films, and talking with public.
September 1969	Amchitka visit by official of National Wildlife Federation, Dr. W. Burr of Division of Biology and Medicine/AEC/HQ and representative of White House Office of Science and Technology.
September 1969	Amchitka visit by Congressmen Goodling of Pennsylvania and Dingell of Michigan.
September 1969	Sixty-six Alaska legislative representatives, civic and conservationist leaders, reporters and photographers were escorted on a one-day visit to Amchitka via chartered plane.
September 1969	Alaska Legislative Council briefed in Anchorage on MILROW safety precautions, and predicted effects. Five representatives of Hawaiian legislature and Governor's office attended the briefing.
September 1969	Hearings before the Senate Foreign Relations Committee on S. J. R. <u>155</u> .
September - October 1969	Maintained Information Center, open to public, in Anchorage Westward Hotel for one week prior to MILROW. Exhibits, motion picture showings and briefings. Approximately 100 invited government and civic leaders "observed" the MILROW event on October 2, with direct line telephone reports from Amchitka. Response -- excellent.
October 1969	MILROW "open file" of technical information established at three universities and the State Museum.
November 1969	Hearings before the (Muskie) Commission on S3042.
December 1969	Briefed Governor's Cabinet in Juneau and his Amchitka Panel in Anchorage on MILROW results. Latter meeting open to public and press.

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- February 1970 Two Hawaiian scientists, advisors to the Governor, visited Los Alamos and the Nevada Test Site.
- April 1970 Three Alaskan news reporters accompanied to Amchitka.
- April 1970 NBC-TV team escorted to Amchitka Island to obtain material on environmental subjects.
- April 1970 Briefings by AEC in Juneau for members of the Alaskan Legislature following hearings by the Joint State Affairs Committees of Alaska Senate and House on Representatives Moses' resolution against testing on Amchitka, open to public.
- May 1970 Governor of Hawaii, Speaker of the Hawaii House of Representatives and Speaker of the Senate was briefed on MILROW results and CANNIKIN plans.
- June 1970 - Routine activity throughout this period.
 March 1971 Examples: Visits to Amchitka by conservationists; transplants of sea otters and Canadian Aleutian geese; follow-up briefings to state officials; review of draft Environmental Statement.
- April 1971 Briefed new Governor William Egan on current Amchitka program and plans. Also briefed, among others, state and local officials, and representatives of University of Alaska and of conservation organizations.
- May 1971 Planned visit to NIS by several members of Alaska State Legislature and by five staff members from Governor Egan's office.

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7. (U) Final Report on the Cleanup of Bikini Atoll.

a. Plans Directorate completed the preparation of the Final Report on the cleanup of Bikini Atoll which was conducted by Director, DASA for the DOD, AEC and Department of Interior during FY 69 and FY 70.

b. The report consists of a narrative account of the cleanup including photographs and an extensive series of enclosures containing supporting or background data.

c. ✓ 8. (U) CANNIKIN Underground Test.

a. Director, DASA has been requested to again provide DOD support to the AEC for an underground test of the SPARTAN ABM warhead at Amchitka Island, Alaska in early October 1971. The support requested is similar to that provided for MILROW in the fall of 1969.

b. The Plans Directorate has been designated to coordinate DOD support for CANNIKIN and develop the necessary plans and organization required to field a joint task group at the AEC supplemental test site, Amchitka. Military requirements requested by the AEC have been forwarded to the JCS who subsequently assigned them to the Service Departments and the Unified/Specified commanders for planning.

c. Preparation of a commander's operations plan by the headquarter's staff and the designation of an operational staff from within DASA personnel resources has been completed.

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RESTRICTED DATA
ATOMIC ENERGY ACT 1954

CONFIDENTIAL

SECRET

RESTRICTED BY
ATOMIC ENERGY ACT 1954



Fort Greely

Declassified Memorandum on Biological and Chemical Warfare

[1953] Department of Defense

Installation Assessment of Gerstle Test Site

[1976] U.S.Army -Chemical Demilitarization and Installation Restoration [pdf file]

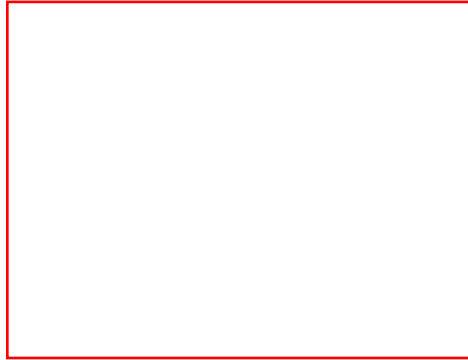
The Nuclear Reactor at Fort Greely

[2000] Alaska Community Action on Toxics



**INSTALLATION ASSESSMENT
OF
GERSTLE RIVER TEST SITE**

**RECORDS EVALUATION REPORT NO. 105
VOLUME 1**



DECEMBER 1976

**DEPARTMENT OF THE ARMY
OFFICE OF THE PROJECT MANAGER
FOR
CHEMICAL DEMILITARIZATION AND INSTALLATION RESTORATION
ABERDEEN PROVING GROUND, MARYLAND 21010**

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ACKNOWLEDGMENTS

The Records Research Team wishes to thank the various military and civilian agencies that have cooperated with it and provided the information contained herein. In particular, the cooperation of the present and former employees at Fort Greely is especially appreciated.

A special note of thanks is extended to Captain James Verney and Captain David Moss, of the U.S.A. Cold Regions Test Center, who served as points of contact for this assessment. They provided excellent liaison, working closely with the Team in arranging interviews and in locating the documents needed for assessment.

Appreciation is also given to Mr. Bert Johns, of Dugway Proving Ground, who accompanied the Team to Fort Greely. He was in charge of test operations for Deseret Test Center from 1962 to 1967 and had intimate knowledge of test and surveillance operations conducted at the Gerstle River Test Site during this period.

i

EXECUTIVE SUMMARY

During August 1976, a Records Research (R/R) study was conducted at Fort Greely to estimate possible contamination at the Gerstle

River Test Site by chemical, biological, and radiological material, and to assess the possibility of contaminants migrating beyond the boundaries of the installation

As a result of the records search survey, it was discovered that the same organization which conducted the chemical agent tests at the Gerstle River area also conducted biological agent tests at the Delta Creek area of Fort Greely, Alaska. It was decided to include the Delta Creek data in this report so that it could be permanently documented.

The approach used by the R/R Team included (1) the evaluation of available documents on the operations at the Gerstle River Test Site and a literature search conducted at other Government agencies including the Department of Defense Explosive Safety Board (DDESB), the U.S. Army Environmental Hygiene Agency (AEHA), the U.S. Geological Survey, the U.S. Department of Agriculture, the Defense Documentation Center (DDC), and the National Technical Information Service (NTIS), and (2) interviews with key personnel including present and former employees of U.S. Army Cold Regions Test Center (CRTC) Fort Greely and Dugway Proving Ground.

Findings

Based on the evaluation of available information, the following findings are presented:

1. The records and personnel interviews indicate that contaminant migration at the Gerstle River Test Site is not a problem since (a) the decontamination procedures used before burial of scrap test materials were thorough and complete, and (b) the soil and moisture characteristics at the site are such that even if contaminants were present, leaching of contaminants into the groundwater is unlikely. The Test Site is located in a remote area with no adjacent home sites. The land is unsuitable for agricultural purposes.
 2. Records covering incoming material for the 1953 - 1958 time frame are incomplete. An accurate accounting on all material shipped into the Gerstle River area for function and surveillance testing is not available. However, interviews with responsible personnel indicate that all munitions subjected to surveillance testing were properly demilitarized. Although all rounds drawn for functional tests were reportedly accounted for with the possible exception of one 155mm round, it is considered possible that other unexploded ordnance munitions and submunitions may be found at the Gerstle River Test Site.
- ii
3. The records indicate that the Gerstle River Test Site is not contaminated by radiological or biological agent materials. A deep well was prepared and instrumented for use as a radiological material disposal well, but it was never used for this purpose.
 4. Two fenced disposal pits are located in the Gerstle River Test Site. These pits were opened in 1970 and contain residue and removed from all known disposal pits in the Gerstle River area. The pits were closed in 1971 after receiving scrap material from pits near Blueberry Lake. Over 400 truckloads of material (dirt plus refuse) were placed in the two pits. Refuse included scrap metal, test vehicles, grid instrumentation, protective clothing, and uncontaminated garbage. The refuse was decontaminated by incineration and chemical treatment before burial.
 5. The records indicate that the Delta Creek area of Fort Greely was used for biological agent testing from 1962 through 1967. Ecological studies were conducted at Delta Creek after testing was completed to assure that active biological materials did not remain at the site,

Conclusion

Based on available records, it is concluded that a preliminary survey of the Gerstle River Test Site is not required.

Recommendations

Whether or not the property is retained, consideration should be given to opening the two disposal pits at the Gerstle River Test Site, examining the decontaminated rubble, and moving it to Fort Greely for disposal in the normal manner prescribed for industrial waste. If the Gerstle River Test Site remains in Army possession, consideration should be given to the removal of the warning signs and fences around the pit areas since these only attract the attention of unauthorized curiosity seekers. The area perimeter fences should remain intact to discourage penetration of the area by unauthorized personnel.

Should it be decided to "excess" the Gerstle River Test Site property, it is recommended that the area be swept by an explosive ordnance disposal team to remove large shrapnel fragments and possible UXO's. One 155 mm HE round was reported to have malfunctioned in this area and it is possible that other UXO's are present since during one of the cleanup operations, three live rounds were discovered.

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I. GENERAL

1. Purpose of the Assessment

To assess the indications of actual or potential contamination by chemical, biological, and radiological material at the Gerstle River Test Site (GRTS) of Fort Greely, Alaska, by searching the available le records and interviewing present and former employees;

To determine indications of contaminants migrating from the Installation; and

To identify potential safety problems.

The Records Research Report will serve as a working document for a subsequent preliminary survey, if required. It should be noted that the purpose of a preliminary survey is to confirm the efficacy of the findings presented in the Records Research Report.

2. Authority

Department of the Army (DA) charter to Project Manager for Chemical Demilitarization and Installation Restoration (DRCPM-DR) dated 22 August 1975.

3. Introduction

In response to a letter from the Office of the Project Manager, Chemical Demilitarization and Installation Restoration (PM/CDIR), requesting the identification of potentially contaminated installations, the U.S. Army Test and Evaluation Command (TECOM) recommended that the Gerstle River Test Site of Fort Greely be included in the program.

The Commander of U.S. Army Cold Regions Test Center (CRTC) at Fort Greely was briefed on the program prior to the start of the onsite records search. The purpose of this briefing was to outline the assessment scope, to provide guidelines to CRTC personnel for the records research effort, and to establish a working relationship. The Commander selected Captain James Verney and Captain David Moss as the points of contact for the Team. The Team was then briefed by CRTC personnel on past test and disposal operations at the Gerstle River Test Site.

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Before the actual onsite review of records began, various Government agencies were contacted for documentation pertinent to the records search effort. Agencies contacted included the Department of Defense Explosive Safety Board (DDESB), the U.S. Army Environmental Hygiene Agency (AEHA), the U.S. Geological Survey (USGS), the library at the U. S. Army Engineer Waterways Experiment Station (WES), the Library of Congress the Defense Documentation Center (DDC), and the National Technical Information Service (NTIS).

The onsite search of available records at Fort Greely was initiated on 16 August 1976, and data were collected through 24 August 1976. The Team included a chemist, hydrogeologist, environmentalist, and ordnance engineers. In addition, the Team was assisted by Mr. Bert Johns, Dugway Proving Ground. Mr. Johns was in charge of test operations for the Desert Test Center from 1962 to 1967 and the Team had to rely in large measure on his testimony and memoranda for record which were, in turn, based on his personal recollections and those of former test directors.

As a result of the records search survey, it was discovered that the same organization which conducted the chemical agent tests at the Gerstle River area also conducted biological agent tests at the Delta Creek area of Fort Greely, Alaska. It was decided to include the Delta Creek data in this report so that it could be permanently documented.

In addition to the review of records, interviews were conducted with more than fifteen persons, including present and former employees (See Appendix A) . Both a helicopter r tour and a ground tour of the site were made. The photographs taken during the tours are included in Appendix B.

Although an attempt was made to obtain the latest, most complete documentation, much of the desired data was not available. More than forty documents (many of which are included in the bibliography, Appendix C) were reviewed. The following sources of information were found to be especially valuable in assessing the Installation and are included in the Appendixes of this report.

A. List of Key Personnel Interviewed

B. Photographs of the Gerstle River Test Site

C. Bibliography

D. List of Biota on Fort Greely, Alaska

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E. Terrain Study of the Army Test Area, Fort Greely, Alaska (A Contribution to Project 8-97-10-004, dated 1957)

F. Environmental Impact Assessment, Bison Habitat Development, Seeding Forage Crop in Jarvis Creek Area, Fort t Greely, 25 March 1974

G. Report on "Operation Cleanup" Alaska, 18 September 1970

H. After Action Report, Relocation of Scrap Material, Arctic Test Center, 29 September 1972 -

J. Installation Natural Resources Management Plan for Fort Greely, Alaska, June 1976

K. Pesticides, Fungicides, and Herbicides That May Have To Be Reported When Used

L. Environmental Impact Assessment, U.S. Army Arctic Test Center, Fort Greely, Alaska (First Revision 10 May 1976)

M. Cooperative Plan For Management of Fish and Game Resources on Army Installations in Alaska (Revised July 1975)

The findings, conclusion, and recommendations are based on the records made available to the Team at the time of the search. In addition, the Team cannot vouch for the accuracy of the data. Where obvious discrepancies existed within the data, attempts were made to

determine the correct information by interviewing the personnel involved in preparing the original data (if they could be located).

4. Summary Description of Fort Greely, Alaska, and U.S. Army Cold Regions Test Center (CRTC)

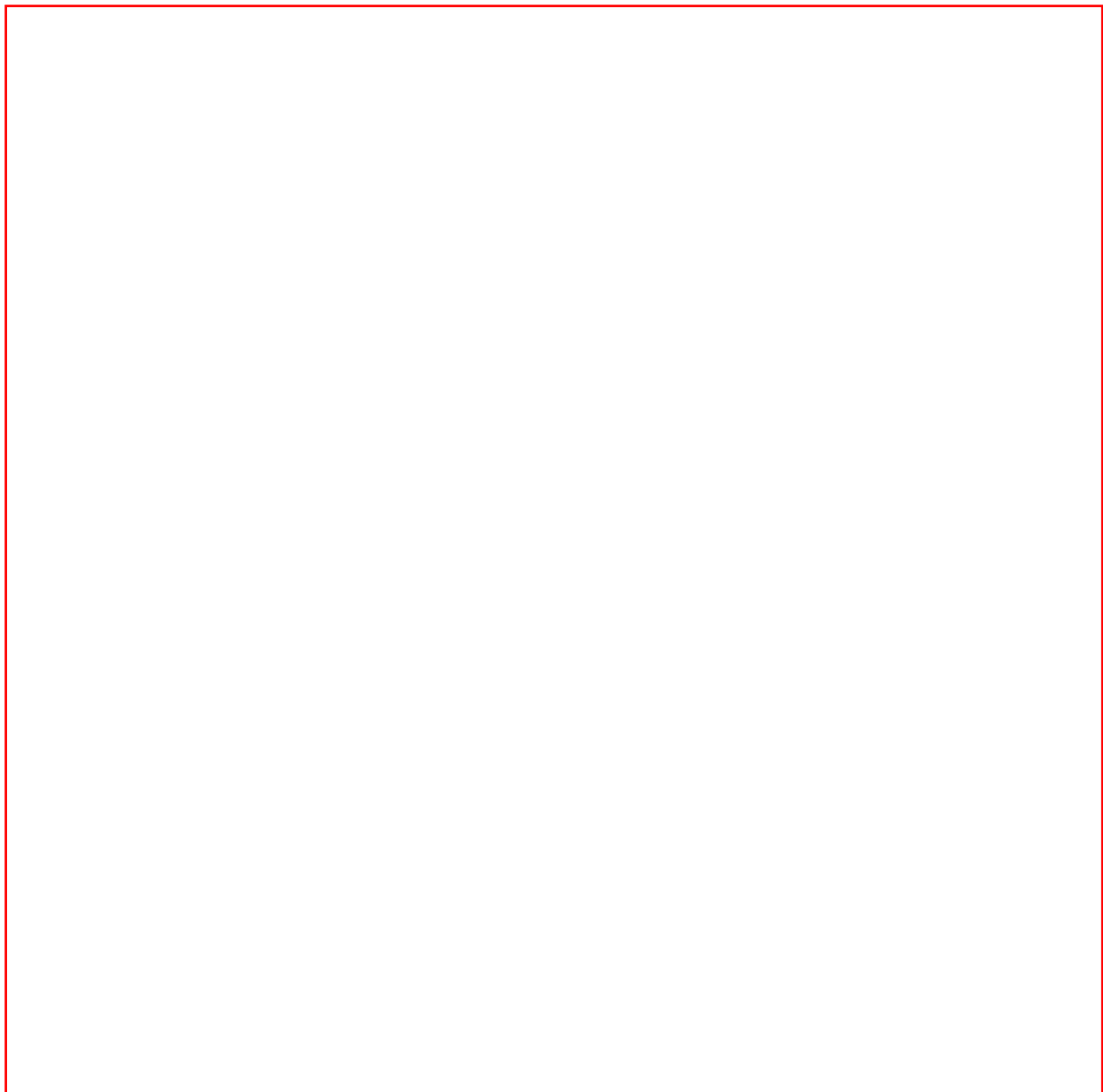
a. Location and Size

Fort Greely, which contains 661,814 acres, lies in the southeastern portion of interior Alaska in an area known as the Tanana Lowlands (figure I-1). Fort Greely is located at 64° 0' North latitude and 145° 43' West longitude, and is 1,277 feet above sea level. The reservation is located 14 miles along the Richardson Highway south of the confluence of the Delta and Tanana Rivers.

The city in closest proximity is Delta Junction, 5 miles north. The nearest center of major population is the city of Fairbanks, 100 miles northwest. Fairbanks is the terminus of the Richardson Highway and the Alaska Railroad.

I-3

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I-4

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The Alaska Highway and the Richardson Highway pass Fort Greely and join at Delta Junction. Other than these main travel routes, there is little road network. Although much of the area surrounding Fort Greely is uninhabited, oil pipeline construction activities are temporarily doubling the local civilian population in the vicinity of Delta Junction.

b. Area Description

Only the main post of Fort Greely is considered improved. The outlying test sites — Gerstle River, Delta Creek, Bolio Lake, Beales Range, Texas Range - are considered semi - improved, with mostly temporary structures.

Although Fort Greely is not a U.S. Army Test and Evaluation Command (USATECOM) installation, the U.S. Army Cold Regions Test Center (a tenant activity at Fort Greely) has operational control of Fort Greely. Chemical, biological, and dud—producing high explosives have been used in the past; however, only conventional high—explosive munitions (and riot control munitions) have been employed in these areas in recent years. The Cold Regions Test Center also uses these ranges for environmental testing. The same area is used by the 172d Infantry Brigade (Alaska) for training. Civilian use of the area is almost entirely recreational.

(1) The USAF Bombing Range and the "Impact Area" (figure I—2) are currently used for testing conventional high—explosives and riot controls. The requirements of the Cold Regions Test Center, 172d Brigade (Alaska), U.S. Air Force, and rotational units from CONUS for a live—fire impact area, coupled with the extreme size of the Impact Area, argue against restoration and demilitarization of this region.

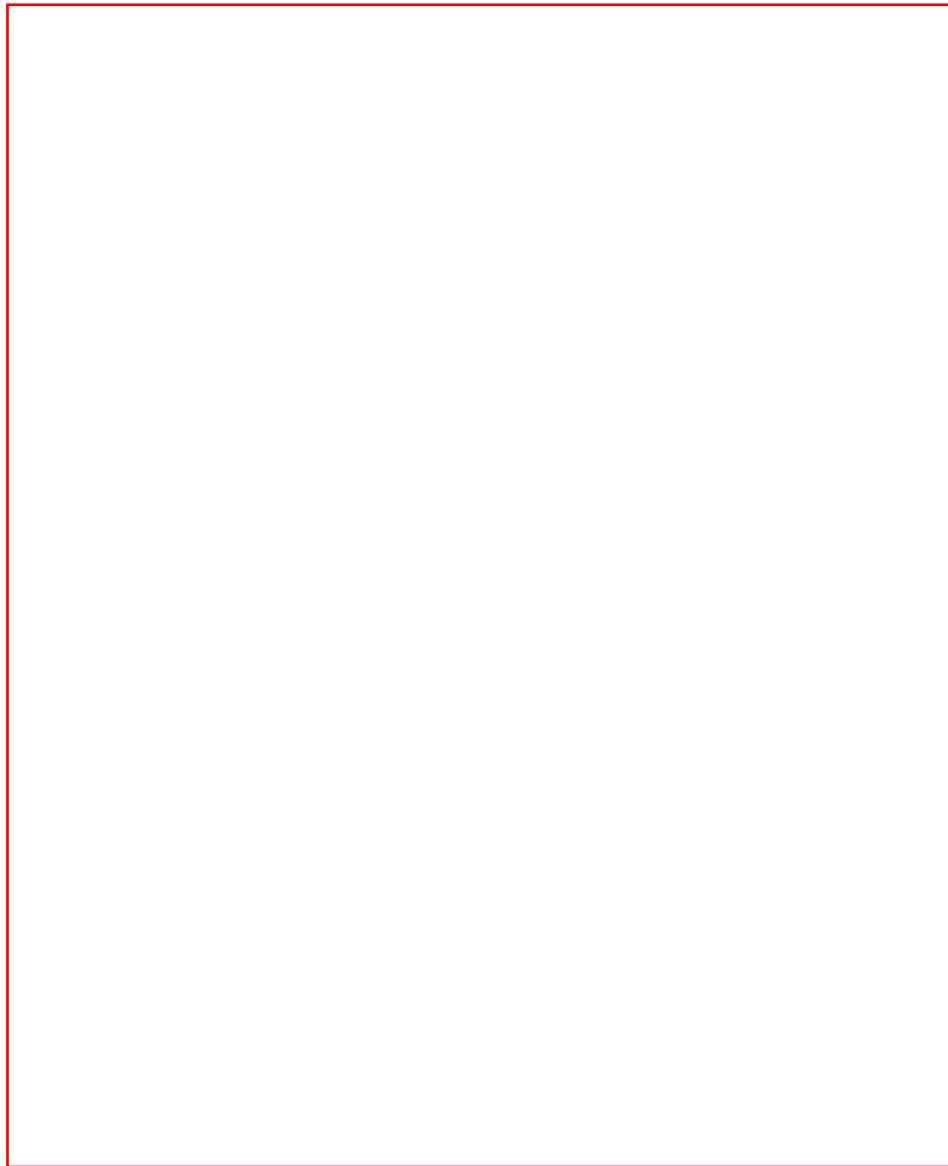
(2) The Gerstle River Test Site (figure I—3) is a 19,000 acre plot of ground 4 miles south of the Alaska Highway approximately 35 road miles from HQ, Cold Regions Test Center (CRTC). The CRTC has no further requirements for the Gerstle River Test Site, but does maintain surveillance over the area by direction of TECOM.

In 1970, "Operation Cleanup Alaska" was completed at Gerstle River, the last of several cleanup operations conducted since 1967. This resulted in all known suspected contaminated material being consolidated into two burial pits. This material was decontaminated and covered. The pits are currently enclosed with barbed wire and marked with warning signs.

(3) The Delta Creek area, adjacent to the USAF Bombing Range, was used for biological agent testing from 1963 through 1967. After testing was terminated, extensive ecological field studies were conducted to assure that all biological materials were detoxified.

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I-6

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I-7
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c. Mission

U.S. Army Test and Evaluation Command Regulation 10-1, dated 19 June 1973, with changes, assigns the following mission to the U.S. Army Cold Regions Test Center (CRTC):

- **Plan, conduct, and report on environmental phases of development tests .**

- **Provide advice and guidance on test and evaluation matters to materiel developers material producers, other services, and private industry.**

- **Conduct other test and evaluations as directed by the Commander, TECOM.**
- **Provide support to Department of Defense, Department of the Army, and AMC for arctic environmental tests and evaluation services not included within the purview above, as directed by the Commander, TECOM.**

- **Plan, conduct, record, and report the results of development tests and evaluations.**
- **Review and comment on planning documents and provide TECOM test requirements for the coordinated test program.**

- **Plan, direct and control a program in test methodology, test instrumentation, and test facilities needed to support current and future test requirements within assigned mission area.**
- **Support field research, studies tests, and operations of AMC Department of the Army, or Department of Defense agencies, as required and directed by Commander, TECOM. As required or directed, provide representation for Army boards, committees, symposia, panels, and conferences.**

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- **Recommend to Commander, TECOM, through established procedures, research and development projects designed to improve TECOM Lest and evaluation.**
- **Assist in the review of training literature and selection of training aids, as directed**
- **Participate in the conduct of combined developmental and operational testing and observe operational test when directed.**

d. History

1) Organization

Fort Greely, Alaska Wing, Air Transport Command, Big Delta, Alaska, was first occupied by Army Troops in 1942. At the time, Fort Greely was known as Station No. 17. From 1942 until 1945, it served as a staging area for aircraft being ferried to Russia under the lend/lease agreement. In 1947, it was designated as the site for Exercise YUKON, which was held during the winter of 1947-48. In November 1948, it became the Arctic Training Center. On 1 July 1949, it was redesignated as the Army Arctic Training Center. In 1953, the site was redesignated as Fort Greely and a permanent post was constructed.

In 1949, the Department of the Army ordered the organization of the Arctic Test Branch at Big Delta Air Force Base (now Fort Greely), Alaska. A cadre for the organization was activated at Fort Knox, Kentucky, in March of 1949, and comprised personnel from each of the Army Field Force Boards. In 1957, it was renamed the U.S. Army Arctic Test Board, with the mission of conducting Arctic Service Tests of all Army Field equipment.

In 1962, as a result of the reorganization of the Army, the Arctic Test Board was established as a class II activity at Fort Greely, Alaska, and placed under the command of the U.S. Army Test and Evaluation Commander. It was expanded to absorb the Research and Development Office, Alaska, and the Technical Service Test Activities, both located at Fort Wainwright, and the Chemical Corps Test Activity, Fort Greely. With the expansion came the additional mission of conducting engineering type tests, to include integrated engineering-service tests. This expansion required an organizational realignment and a greater instrumentation capability.

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On 1 March 1964, the U.S. Army Arctic Test Board was redesignated the U.S. Army Arctic Test Center. During 1966, the General Equipment Test Branch located at Fort Wainwright was absorbed by the Nuclear, Biological, Chemical, and Special Projects Division at Fort Greely.

Since 1966, the Center has undergone several organizational realignments, the last occurring in April 1973, which place it in its present configuration. Figure I-4 depicts the most recent Organizational Chart for Fort Greely. On 1 July 1976, the U.S. Army Arctic Test Center was redesignated the U.S. Army Cold Regions Test Center.

(2) Land Usage

(a) Fort Greely Reservation. The original tract of land was acquired on 30 October 1943 by the Federal Aviation Agency (FAA) (then known as the Civil Aviation Agency) as Air Navigation site 162. The acquisition was for 3,920 acres, known as Big Delta Army Base. The Army had use of the area except for a small portion of the northwest corner, which was utilized by the FAA as a radio station. That radio station is still in use. Subsequent to the above acquisition, 10,543 acres of adjacent land were acquired by use permit from the Department of the Interior; this area was later made a permanent addition in 1944. In 1955, 160 acres east of the above-mentioned land were added.

This tract is designated as an Ammunition Storage Area. In 1961, an area of 572,000 acres was reserved for use as a maneuver area; this area is also utilized as a test site by the U.S. Army Cold Regions Test Center. The area between Main Post and Granite Creek (51,590 acres) was added in 1961, and an area of 640 acres adjacent to the Midas Satellite Tracking Site was added in 1963.

(b) Gerstle River Test Site. The Gerstle River Test Site, acquired by the U.S. Army in 1952 for an indefinite period, was used by Dugway Proving Ground for chemical and high-explosive testing from 1954 to 1962. Surveillance testing of chemical munitions was conducted in the area from 1962 to 1967 by the Arctic Test Center. Since 1967, no chemical munitions (except flame) have been tested in the area. An area of 78,548 acres, known as the Gerstle River Expansion Area, was granted by State of Alaska leases. This "Expansion Area" and associated acreage was relinquished to the State upon lease termination in June 1970.

(c) Black Rapids Training Site. The Black Rapids Training Site is made up of 3,807 acres, which were granted by Public Law. All of the above land is utilized for training purposes by the Northern Warfare Training Center.

I-10

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I-11

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(d) **Total Acreage of Fort Greely Installation.** As of December 1974, the total acreage encompassed by the installation is 661,814 acres .

5. Environmental Setting

a. Water Quality

(1) Surface Water

The Tanana River and its tributaries form the major drainage system in the vicinity of Fort Greely and the Gerstle River Test Site. Tributaries to the Tanana River include the Delta River and its tributary Jarvis Creek, Delta Creek, Little Delta River, and Gerstle River. Figure I-5 shows the position of these streams except Delta Creek and Little Delta River, both of which lie west of the area shown in the figure. The tributary streams originate from glaciers in the Alaska Range and flow in a northerly direction until they empty into the Tanana River. Segments of these streams have a braided character which consists of several small interconnecting channels within their outer banks. The surface drainage from Fort Greely proper and the Gerstle River Test Site are independent of each other until the Tanana River is reached.

The surface water in the Gerstle River Test Site includes Gerstle River, Sawmill Creek, and several other creeks and lakes (figure 1-6). The creeks originate in the Granite Mountains and flow through the Test Site in a northerly direction and empty into a low lying area north of the Site where they terminate. The major stream near the Test Site is Gerstle River which originates from Gerstle glacier in the Alaskan Range some 17 miles southwest of the Site. This river flows in a northeast direction forming the southeast border of the Site and empties into the Tanana River, 20 miles north of the Site. Only a very minor quantity of surface runoff enters the Gerstle River from the Site. Several elliptical, shallow ponds and lakes are located in the southeastern portion of the Site. The annual precipitation is between 10 and 12 inches per year. Because of the extremely cold temperatures during most of the year, the drainageways carry water only during the summer months.

(2) Groundwater

The coarse-grained glacial material that underlies Fort Greely provides an excellent source for groundwater. Fort Greely proper receives its water from wells drilled 198 to 400 feet into this material. Well No. 2, near the Allen Airfield, was drilled to 198 feet and the water table was encountered at 184 feet. Data shows that the water table at the



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Nuclear Power Plant varied from 187 to 212 feet below the surface. West of the Richardson Highway, water was encountered at 135 feet in the Beales Firing Range. Generally, the saturated zones consist of gravels and sands.

The water level in one boring at the Gerstle River Test Site is at 453 feet below the ground surface. The producing aquifer occurs between depths of 468 to 472 feet in a sandy gravel. The total depth of this well is 549 feet. Additional water level data are presented in table I-1.

b. Fauna and Flora

(1) Fauna

The major animal species which occur at Fort Greely are moose, caribou, buffalo, black and grizzly bear, wolf, wolverine, muskrat, marten, snowshoe hare, beaver, fox, lynx, red squirrel, and ground squirrel. Fish species include lake trout, silver salmon, grayling, northern longnose suckers, and rainbow trout.

There are over 50,000 acres of lakes with the installation; most of these lakes are small (8 to 20 acres) and inhabited only by suckers. However, there are eight lakes, comprising 291 acres, that are easily accessible to civilian automobiles; these lakes are stocked every other year with lake trout, rainbow trout, silver salmon, and grayling.

Alaska is located on the Atlantic flyway. The numbers and species of birds migrating to and from Alaska are numerous.

A list of the fish, mammals, and birds of Fort Greely is provided in Appendix D.

Hunting is not allowed at Fort Greely. The entire post, with the post cantonment and areas immediately adjacent to roads and recreational lakes, is not open to general hunting and trapping.

(2) Flora

(a) **Native Vegetation.** Fort Greely lies wholly within the boreal forest, which is one of the three broad classifications of vegetation (tundra flora, boreal forest, and coastal forest) covering the state. The boreal forest of Fort Greely is a thin forest, predominately white and black spruce trees (*Picea glauca* and *Picea mariana*). Intermixed with the spruce are birch (*Betula papyrifera*), quaking aspen (*Populus tremuloides*), balsam poplar (*Populus balsamifera*), and tamarack (*Larix*

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Table I-1. Water Level Data

WELL NO.	LOCATION	TOTAL DEPTH (FEET)	WATER LEVEL (FEET)	REMARKS
1	Fort Greely Building 131	235	186	
2	137	198	184	
3	G 153	200	132	
4	117	215	178	Permafrost at 24-88; 96-108 feet
5	329	220	198	

6		300	218	182	Permafrost at 40-118 feet
7		370	200	-	
8		625	400	215	
9		606	270	197	
10 SM-1A	Fort Greely Nuclear Plant		*329	199	
11 SM-1A	Fort Greely Nuclear Plant		*332	201	
12 SM-1A	Fort Greely Nuclear Plant		*304	198	
13	Dilution Building		248	187	
14	Contractors Well		252	212	
15	Beales Range		*165	135	
16	Bolio Lake		300	242	
17	Gerstle River Test Site		549	453	
18	Tank Range		320	242	

*Casing depth

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laricina). Generally, aspen grows on well-drained sandy or gravelly soils; white birch is most conspicuous on well-drained south-facing slopes; and spruce, often with an intermixture of birch and tamarack, grows on poorly-drained areas.

Dwarf heath shrubs especially in the birch family, are the dominant understory in the boreal forest. Mosses and lichens form the ground cover, along with cranberry and snowberry bushes. In places, sphagnum moss and horsetail are dense. Willow and alder shrubs are dominant in poorly drained areas.

(b) Agricultural Crops. The agricultural crops of the area include grasses, legumes, small grains, fruits, and vegetable, as follows:

<u>Grasses</u>	<u>Legumes</u>	<u>Vegetables</u>	
Brome grass	Clover	Potatoes	Turnips
Timothy		Carrots	Endive
Bluegrass		Cabbage	Green onions
Red fescue	<u>Small Grains</u>	Lettuce	Squash
Meadow foxtail		Radishes	Beets
Ryegrass		Cauliflower	Green beans

Orchardgrass
Reed canarygrass

Barley
Oats
Wheat

Broccoli
Brussel sprouts
Peas
Spinach
Rutabagas

Small Fruits

Raspberries
Strawberries
Currants

(c) **Planted Areas.** There are no cemeteries or maintained golf courses on Fort Greely. However, the lawns, parade grounds, and athletic fields have been planted with Kentucky Bluegrass, Nugget Bluegrass, and Artca Red Fescue. These areas are maintained with scheduled fertilizing, irrigation; and mowing throughout the summer months and have become attractive, well-established lawns.

Earth-covered ammunition storage magazines are overgrown with natural grasses, Kentucky Bluegrass, Nugget Bluegrass, and Artca Red Fescue. The goal is to camouflage the nature of the facility from aerial observation and four or five more years of undisturbed growth will complete the program.

About 90 acres of the Buffalo Drop Zone were planted two years ago with barley, oats, brome, and fescue to provide a feeding ground for the Delta bison herd, which resided predominately on Fort Greely. The drop zone itself is over 1,000 acres in extent, but the seeded area

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served to attract many buffalo and thus keep them out of local farmers' fields. Some brome and fescue still grow there, but a new planting of all four varieties is anticipated for 1976 or 1977, depending upon budget limitations .

Trees planted as a part of the landscape Planting Program are restricted to local indigenous species and include paper birch, white spruce, quaking aspen, and a variety of willows. Shrubs include Siberian pea shrub, wild rose, American red currant, and western dogwood.

No ground cover plants or vines are planned, although family housing occupants are encouraged to plant snowberry, cranberries, and blueberries on their own initiative. These and other edible ground cover species are locally available in the forest and hills.

The Landscape Planting Program is about 12 percent complete, with 75 of a scheduled 600 trees planted. The target date for completion is 22 October 1978. The program involves all of the main post cantonment, including family housing office and industrial buildings, troop areas, school grounds, and public use areas. Initial construction of the cantonment left no vegetation whatsoever so that the combination of the Landscape Planting Program and the plants established by families and troop units has made a great improvement.

The major portion of the post is classed as virgin taiga and no improvements are anticipated outside of erosion control plantings. Over 600,000 acres are involved, most of it being utilized for troop maneuvers and artillery ranges.

Appendixes E and F provide more information on the flora of the area.

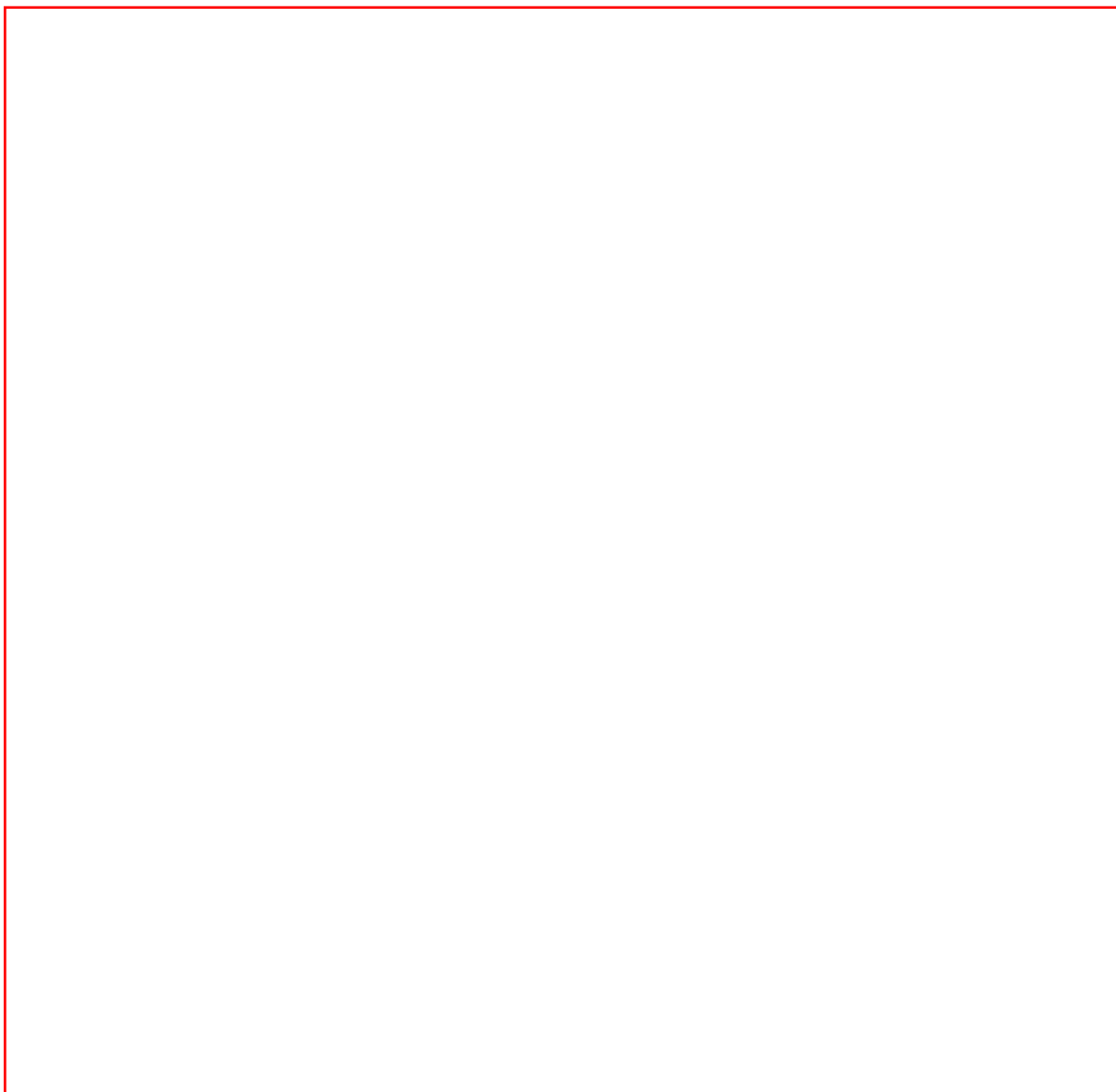
c. Geology

(1) Physiography and Topography

Physiographic units in the region are the Alaskan Range, Tanana Lowlands, and the Yukon-Tanana Uplands (figure I-7). Fort Greely and the Gerstle River Test Site lie in the Tanana Lowlands except for a small area of the Test Site that falls in the Granite Mountain which is a part of the Alaskan Range. The lowlands are an elongated province that trends in a northwest-southeast direction and lies between the Alaskan Range to the south and the Yukon Uplands to the north. The lowlands in the vicinity of Fort Greely are characterized by flat to

undulating glacial and alluvial landforms .

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Glacial landforms include outwash plains and moraines; the alluvial landforms are flood plains, terraces, and aprons. The elevation at Allen Airfield in the northern portion of Fort Greely is approximately 1200 feet above mean sea level (msl), while some 13 miles to the south the elevation reaches 1600 to 1800 feet in the vicinity of Donnelly Dome.

The Gerstle River Test Site, approximately 25 miles southeast of Allen Airfield, parallels the Alaskan Highway and consists predominately of alluvial aprons, moraines, and stream deposits. The overall slope is to the northwest and varies in elevation between 1260 and 2000 feet. The western portion of the Site lies in the Granite Mountains. These mountains exhibit steep slopes with elevations reaching 3500 feet.

(2) Geologic Formations

Geologic units within Fort Greely include (from oldest to youngest) the Birch Creek schist (Precambrian), granodiorite (late Mesozoic), Jarvis coal beds (Tertiary), till outwash and loess (Pleistocene), and recent alluvium, terraces, and fans.

The Birch Creek schist is predominately a quartz-sericitic schist, locally containing layers of quartzite and black carbonaceous schist. The schist is exposed along the southern edge of West Donnelly and on Donnelly Dome, 15 miles south of Allen Airfield. The gray granodiorite outcrops extensively in the Granite Mountains and is a coarse-grained igneous rock consisting of quartz, feldspar, biotite, and hornblende. The Tertiary sediments include clay, sand, shale, coal, conglomerate, and outcrops on the west slope of West Donnelly. Quaternary deposits cover the remaining area of Fort Greely. These deposits consist of Donnelly and Delta till and outwash which were deposited during Pleistocene time. A discontinuous mantle of loess covers the glacial deposits. Recent alluvial deposits occur in the flood plains and Pleistocene terraces, along some of the streams and fans that join the mountains and hills.

Geologic units within the Gerstle River Test Site include a small area of Mesozoic granitic intrusives; the remaining area consists of Quaternary sands, silts, and gravels (figure I-8). The granitic intrusives include quartz, feldspar, biotite, and hornblende as described above. The Quaternary deposits are divided into two units based on origin and method of deposition. The smaller of the two units in a real

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extent consists of small moraines resulting from the relatively short advance of the ice streams from the mountains. Moraine and till deposits are characteristic of these areas. The larger unit consists of recent alluvial unconsolidated material and gravel.

(3) Soils

No published soils data are available for the Gerstle River Test Site; however, from the reconnaissance and the published soils data west of the Test Site, the soils are believed to be similar over the Test Site. Sand, silt, and gravel constitute the major soil type. A thin cover of organic silt occurs in the area with the silt increasing in depth around the lakes and bogs. Sands, gravels, and silts (unit 1, figure I-8) are old stream and lake deposits that have been reworked by the action of younger streams. Included in these areas (unit 1) are the sands, gravels, and angular rock fragments from the till and outwash from the mountains. The morainal areas (unit 2, figure I-8) consist of moderately weathered yellow-gray sandy clays and silts with angular to rounded rock fragments. The percentage and size of rock fragments tend to increase toward the mountains. The granitic intrusive areas (unit 3, figure I-8) occur in the Granite Mountains where a thin veneer of soil is disrupted by rock outcrops.

Driller's logs indicate that the subsurface materials under the main post of Fort Greely and just west of the Richardson Highway are layers of sands, silts, and gravels and various mixtures of these soils. Layer thicknesses and soil types are variable. Only one well log (boring 17) was obtained for the Gerstle River Test Site. This log indicates that the zone between 145 and 160 feet consists of silty sand and sand while the remainder of the hole (549 feet) consists of gravel with varying amounts of silt and sand. Boring locations are shown in figure I-9 and the available logs for Fort Greely and the Gerstle River Test Site are presented in table 1-2.

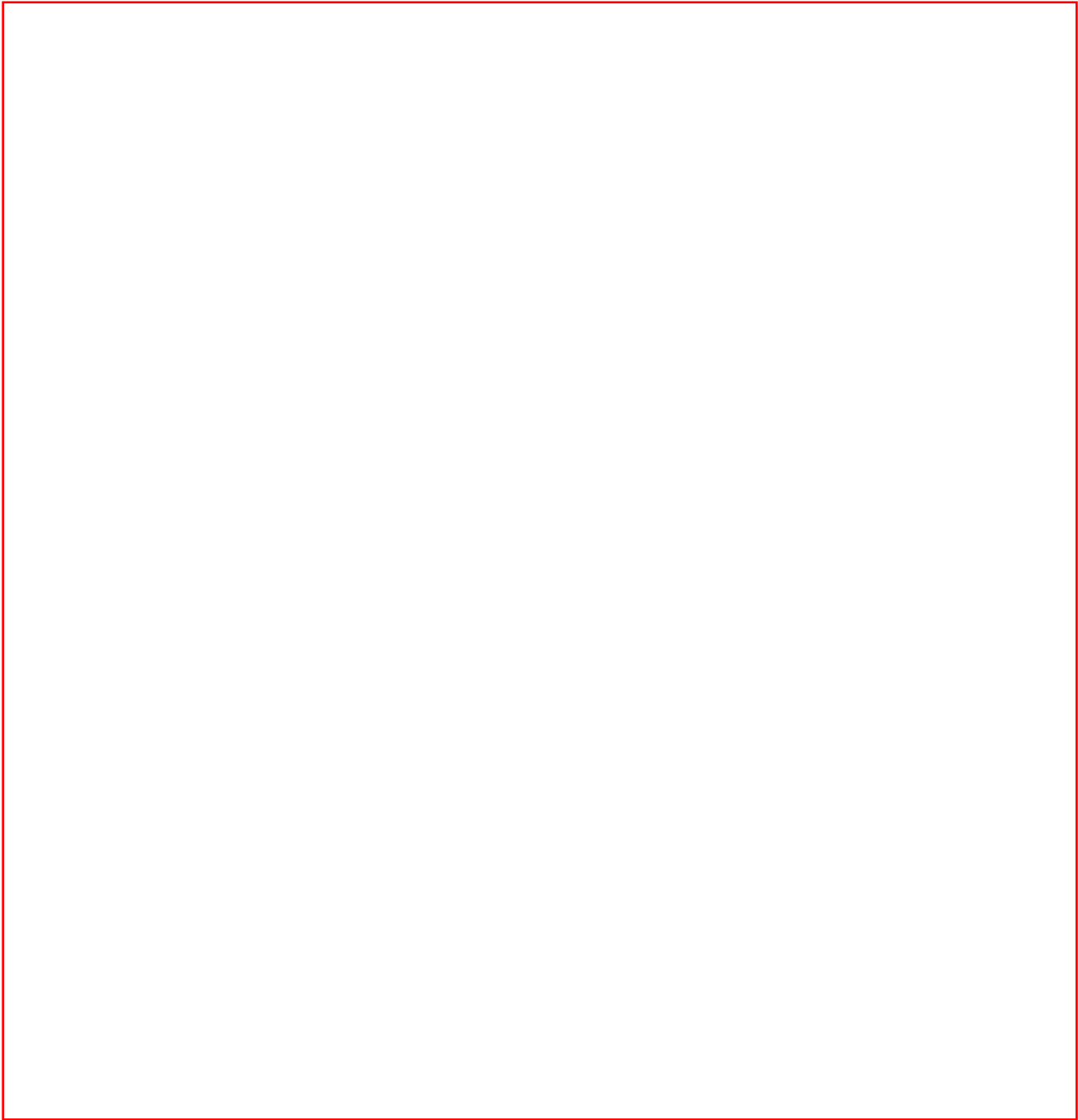
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Table I-2 Drilling Logs

Boring NO.	Depth (FT)	Description	Boring NO.	Depth (FT)	Description
4	0-10	Sand and Gravel	8 cont.	310-315	No Data
	10-40	Sand, Gravel and boulders		315-330	Silt, sand, and gravel, dirty w/few large boulders

	40-88	Sand and Gravel		330-335	No Data
	88-96	Red sand, very soft, unfrozen		335-350	Silt sand and gravel, compact
	96-122	Sand and Gravel		350-390	Sand and Gravel (355-385 semi water-bearing)
	122-128	Red sand and small gravel		390-395	Gravel, sand, and silt, compact
	128-143	Grey sand and gravel, soft		395	Coarse gravel and sand, good flow of water
	145-175	Red sand and gravel	9	0-15	Gravel
	175-185	Fine sand and gravel, water bearing		15-25	No Data
	185-195	Coarse sand and gravel		25-40	Gravel, sand, and sandy silt
	195-203	Sand and small gravel		40-50	No Data
	203-214	Coarse sand and gravel		50-60	Sand and gravel
6	0-110	Sand and Gravel		60-70	No Data
	110-125	Sand and Gravel - air pocket at 118 ft		70-90	Dirty gravel and sand
	125-145	Sand and Gravel		90-99	Clay, silty gravel
	145-175	Sand and Gravel - water at 158 ft		99-140	Clay gravel
	175-218	Sand and Gravel		140-150	Clay gravel, compact
8	0-5	Topsoil		150-170	Clay gravel, gravel and silt
	5-150	Gravel and silt		170-180	Clay gravel, compact
	150-160	Gravel and silt, permafrost gas		180-190	Clay gravel, gravel and silt
	160-280	Gravel and silt		190-200	Clay gravel, gravel, silt, and sand

	280-299	Gravel, very high silt content		200-210	Clay gravel, gravel, silt, sand, compact
	299-300	Gravel, dirty		210-213	Silt, sand and gravel
	300-305	No Data			
	305-310	Silt, sand, and gravel, dirty			

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Boring NO.	Depth (FT)	Description	Boring NO.	Depth (FT)	Description
9 cont	213-224	Medium coarse sand and gravel, low silt content (water-bearing), cemented	17 cont	80-104	Silty sandy gravel, few boulders
	224-229	Sand and gravel silt, water-bearing water level 197 ft		104-145	Silty sandy gravel w/few boulders, small amount of water below permafrost at 122 ft
	229-234	Clay, gravel, sand and silt		145-156	Silty sand
	234-239	Gravel, sand, and silt, cemented		156-160	Sand
	239-244	Sand, silt and gravel		160-468	Silty sandy gravel w/cobbles and boulders
	244-250	Cemented gravel and sand		468-472	Sandy gravel, water-bearing
	250-255	Cemented gravel and sand, coarse		472-549	Silty sandy gravel grading into sandy gravel
	255-260	Cemented silt, sand, little gravel	18	0-25	Sandy gravel and boulders
	260-270	Gravel and sand	(Drilled)	25-35	Gravelly sand
15	0-2.5	Silt	4 May	35-45	Gravelly sand with boulders

	2.5-6	Silty gravelly sand, scattered cobbles	to	45-50	Sand and gravel, saturated
	6-34	Sandy gravel to gravelly sand to sand	30 June	50-85	Grey till
	34-48	Silty gravelly sand, compact	1962)	85-100	Tan and Grey tills
	48-53	Sand, with fine pebbles		100-110	Tills
	53-69	Sandy gravel to gravelly sand, max 5 inch		110-115	Show of water, 5 ft hd, dirty formations
	69-100	Silty gravelly sand to gravelly sandy silt		115-150	Tan and Grey tills with gravel
	Remainder of depths not legible on driller's log, Total depth 300 ft. Material is generally the same as above.			150-165	Olive-Drab till
16	Data not legible above 200 ft.			165-200	Light brown silty
	246-272	Silty sand, some gravel		200-225	Sand with some fine gravel in streaks
	272-300	Gravelly sand		225-255	Light brown silty sand with streaks of coarser gravel
17	0-2	Silt		255-280	Light brown silty sand, water-saturated, occasional streaks of gravel
	2-68	Silty sandy gravel, few cobbles		280-300	As above, more gravel and more water
	68-80	Sandy gravel		300-322	Sand and gravel, aquifer Gravel 2-inch maximum size

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II. CONTAMINATION ASSESSMENT

1. Mission and Tenant Activities

a. Test Facilities

In 1954, Dugway Proving Ground (DPG) initiated a comprehensive program for the surveillance testing of chemical and biological materials in the five major environments. The Gerstle River Test Site, located approximately 30 miles south of Fort Greely, Alaska, was established as the Arctic Test Site. A chemical testing facility was constructed at Gerstle River Test Site (figure II-1) to accommodate the environmental surveillance testing and dissemination testing of chemical munitions. This structure was also utilized as a command post and security post and has had at least one guard posted around the clock since its construction. A chemical Arctic Test Activity was established at Fort Greely in 1956 as a class II activity which reported directly to DPG. This activity consisted of two officers and twenty-five enlisted personnel. In 1964, this activity was designated the U.S. Army Arctic Test Center. In July 1976, the Arctic Test Center was redesignated the U.S. Army Cold Regions Test Center.

b. Field Test Sites

(1) Gerstle River

From 1954 to 1962, a comprehensive Arctic Environmental! Surveillance Program on Chemical Corps material was conducted at the Gerstle River Army Test Site. Limited cold weather dissemination testing of GB and VX was conducted in this area. Single round, statically fired GB-filled munitions were tested in the winters of 1955-56 and 1956-57. Six trials of VX-filled M23 mines were conducted in the winter of 1960-61; each trial consisted of statically functioning one VX-filled mine and one simulant filled mine to test dispersion characteristics in an Arctic environment.

When the U.S. Army was reorganized in 1962, USATECOM was assigned the responsibility for the conduct of the CB Long Term Environmental/Surveillance Program. The Chemical Arctic Test Activity at Fort Greely then become a division of the Arctic Test Center; DPG was designated by USATECOM as the monitoring agency for the conduct of this program.

In 1962, the Deseret Test Center (DTC) was established with headquarters in Fort Douglas, Utah; DTC initiated field testing at the Gerstle River Army Test Site in December 1962. Liaison was achieved and maintained with Commander in Chief, Alaska, United States Army, Alaska, Fort Greely, Arctic Test Center; and the state of Alaska Fish and Game Department.

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Testing was conducted by DTC in three general areas at Fort Greely: (1) the Gerstle River Army Test Site, (2) the expanded Gerstle River Test Site, and (3) the Delta Creek area. Table II-1 lists the tests that were performed by DTC at the Gerstle River areas and figure II-2 depicts the test locations.

The majority of testing at the Gerstle River Army Test Site was with single round, statically fired, chemical munitions. However, GB-filled 155mm howitzer shells were dynamically fired into spruce forests (depicted as grid location 8, figure II-2). Simulant-filled and HE 155mm howitzer shells were also fired to spruce and aspen forests (grid locations 8A, SB, and 9A, figure II-2) to determine height of burst information for planning for Devil Hole I and II. The only dud/malfunctioned munition that was reported in all of the DTC testing conducted at Gerstle River test areas was on this program; the unlocated dud was a dynamically fired M107 155mm HE shell fired 28 August 1964. This was on the high angle height of burst test in an aspen forest at grid location 9A vicinity. Significantly, all of the test grids at the Gerstle River Test Site have been sampled and declared free of residual agent hazard. Residual test munitions have been disposed of and the munitions holding areas have been completely cleared.

Several large scale trials were conducted in the expanded Gerstle River Test Site at grid locations 9, 10 (aspen grid location), and 11 (spruce grid location).

Statically and dynamically fired agent GB munition dissemination trials were conducted in the large aspen forest at grid location 9; included were some trials using dynamically fired GB-filled 155mm howitzer shells. Agent VX trials were conducted (July 1966) at grid locations 10 and 11; also included were dynamically fired 155mm howitzer trials at grid location 10.

(2) Delta Creek

Although not located within the Gerstle River test area, the Delta Creek area was utilized by DTC during the 1963-67 period to conduct

biological testing (table II-2).

The Delta Creek area (grid locations 13, 14, 15, and 16, figure II-3) was carefully selected for the biological dissemination trial outlined in table II-2. Extensive meteorological and ecological field studies and surveys were conducted in order to prove that the program could be conducted safely. The test site was the actual river bed of Delta Creek (figure 11-4) in the most physically isolated and inaccessible part of the

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Table II-1. Chemical Tests (Gerstle River)

Number and Test	Date	Munition	Number of Trials	Total Agent	Location on Maps
63-3 Whistle Down	6 Dec 62- 5 Feb 63	M23 Land Mine VX	5	5 Mines, 26 kg	1
		M121A-1 155mm How GB	5	5 Projectiles, 14.5 kg	2
		M55 Rocket GB	5	5 Rockets, 26 kg	2
		M55 Rocket GB	1	1 Rocket, 5.2 kg	1
65-14 Elk Hunt I	3 Jul- 15 Aug 64	M23 Land Mine VX	2	16 mines, 83.2 kg	3 grass
		M23 Land Mine VX	5	40 mines, 208 kg	4 shrub
		M23 Land Mine VX modified	5	40 mines, 194 kg	4 shrub
		M23 Land Mine VX	5	40 mines, 208 kg	5 wooded 6
		M23 Land Mine std & mod VX	3	6 mines mod 29 kg 6 mines std 31 kg	water (temporary water hole)
Devil Hole Prelim HOB	24 Aug- 28 Aug 64	M121A-1 155mm How Simulant	10		8B, 911-740
		M107 155mm How HE	39		8B, 911-740
		M107 155mm How HE	23		8A, 907-723
		M107 155mm How HE	28		8A, 907-723
		M121A-1 155mm How Simulant	9		9A, 890-796
		M107 155mm How HE	25		9A, 890-796
		M107 155mm How HE	25		9A, 890-797
		M107 155mm How HE	25		9A, 893-795
65-14 Elk Hunt II	7 Jun- 29 Jul 65	M23 Land Mine, VX (various combinations of bangalore torpedos and line charges)	13	64 mines, 333 kg	3 dead grass
			10	80 Mines, 416 kg	4 Shrub
		M23 Land Mine, VX (various combinations of bangalore torpedos and line charges)	12	14 Mines, 73 kg	7 vehicles, 2 on cleared ground
		M23 Land Mine, VX (various combinations of bangalore torpedos and line charges)			

63-12 Devil Hole I	2 Jul- 8 Sep 65	M121-1 Shell, 155 How GB	35	24 dynamic and 26 static shells (50 kg)	9 Aspen 9 Aspen
		M121-1 Shell, 155 How GB	27	23 dynamic and 18 static shells (123 kg)	
		M55 Rocket, GB	16	16 Shells, 83 kg	

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Table II-1. Chemical Tests (Gerstle River) - Continued

Number and Test	Date	Munition	Number of Trials	Total Agent	Location on Maps
65-11 Sundown	21 Jan- Apr 66	BLU 19/B23 GB	20	20 Bombs, 40 kg	8
66-3 Swamp Oak	21 Jan- 8 Apr 66	M121A-1 Shell, GB	34	34 Shells, 102 kg	8
66-1 Devil Hole II	28 Jul- 12 Sep 66	M426 8" How VX	10	10 Shells, 65 kg	10 Aspen
		M121A-1, 155mm How VX	46	24 Dynamic and 22 static shells, 138 kg	10
		M121A-1, 155mm How VX	22	22 Shells, 66 kg	11 Spruce
67-2 Dew Point	14 Jul- 14 Sep 67	BLU 19/B23 Bomblet, GB	30	30 bombs, 59 kg	9
		M139 Bomblet, GB	30	30 bombs, 18 kg	9

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Biological Tests (Delta Creek)

Number and Test	Date	Munition	Number of Trials	Total Agent	Location on Maps
64-5 Night Train	1 Dec 63- 8 Jan 64	A/B 45Y-1 Spray Tank, BG-1, F100 and F105, simulant	18	1188 kg	12
			4	21 kg	12
65-3 West Side 1	8 Jan- 23 Feb 65	A/B 45Y Spray Tank, BG-2, F105, simulant A/B 45Y-1 Spray Tank, BG-1, F105, simulant	22	236 kg	13
			8	653 kg	13 tower fly by

Special Study Alaska	1 Oct- 10 Dec 65	E26 Dispenser, LVS, simulant	6	42 liters	14 forest
		*E26 Dispenser, SM	6	42 liters	14 forest
		*E26 Dispenser, EC	6	42 liters	14 forest
		*E26 Dispenser, SM (BG-1 intimately mixed on all trials)	6	42 liters	15 river bed
					96 liters
67-7 Rev.Cloud	7 Dec 66 19 Feb 67	M32 Disseminator, ZZ, BG-2	8	22 kg 22 kg	16
		M143 Bomblet, TT	12	3 liters	16
		E26 Dispenser, TT	16		16
		BG		256 liters	
		*E26 Dispenser, EC	6	96 liters	16
		BG	11	96 liters	16
		*E26 Dispenser, SM		196 liters	
		BG		196 liters	

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Biological Tests (Delta Creek) - Continued

Number and Test	Date	Munition	Number of Trials	Total Agent	Location on Maps
67-8 Watch Dog	19 Jun- 25 Aug 67	E26 Dispenser, TT	11	77 liters	16
		BG-1		11 liters	
		E32 Disseminator, ZZ	8	37 kg	16
		BG-2	8	37 kg	16
		*E26 Dispenser, EC	10	48 liters	16
		BG-1		16 liters	
		*E26 Dispenser, SM	6	48 liters	14 forest
		BG-1	4	16 liters	14 forest
E26 Dispenser, TT		12 liters			
BG-1		4 liters			
*E26 Dispenser, EC		24 liters			
BG-1		8 liters			

* Classically these are considered simulants, but recent information from Center for Disease Control Atlanta, GA has implicated SM and EG as potential infectious agents. These agents can cause secondary infections among hospitalized personnel.

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Fort Greely Military Reservation. A specially constructed high floatation D-8 caterpillar was used to build a runway on a long gravel bar near the Command Post and all transportation for the activity in the Delta Creek area was by fixed wing and helicopter support.

c. Storage of Chemicals

There are no chemical or biological materials stored at U.S. Army Gerstle River Test Site or on Fort Greely property . All materials were removed from Alaska by 1969/1970, the last major cleanup being Blueberry Lake on the Gerstle River Test Site.

2. Decontamination Operations

a. Gerstle River

At the conclusion of the VX trials in the Gerstle River test area, selected test equipment was decontaminated and returned to stock; however, most of the contaminated equipment was left on the grids for two years for decontamination weathering. A cleanup operation was conducted in September 1968 to remove the material from the grids and bury it in a large refuse pit (figure II—5). This pit was located in the Command Post area near the test refuse pit. For collection of the debris associated with large - scale test operations in each remote location, a refuse pit was normally dug in the Command Post (CP) area. Both daily refuse (e.g., uncontaminated garbage) and test refuse were collected in this pit, burned regularly and then covered. Contaminated material was decontaminated as thoroughly as possible before it was placed in the pit. On VX trials, the debris included housekeeping trash, used gas mask canisters, defective or damaged protective clothing, defective or damaged field/laboratory equipment, and reagents. Test debris and trash such as canvas, rope, wood, plastic, rubber, and wire were also placed in the refuse pits.

Blueberry Lake (figure II—9) became a controversial subject during the 1969/1970 period and to date is a sensitive issue.* In the winter of 1965, a number of chemical munitions were stored on the ice of Blueberry Lake for ultimate disposal during the same year. For unknown reasons, the shells were neglected and finally sank to the bottom of the lake during the spring thaw. The incident became known sometime in 1969 and DTC assisted ATC in a project to remove the shells from the bottom of the lake.

* Blueberry Lake is actually a small catch basin rather than a lake; it measures 1000 feet in diameter and has no inlet or exit streams. The water in the basin is derived from small spring action in the area and runoff from the melting snow.

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The lake project was started in May 1969. A 350 gallon per minute (gpm) centrifugal pump with 850 feet of 6-inch pipe and 60 feet of 4-inch pipe was used to drain the lake. The water was pumped over a small rise into another small lake west of Blueberry Lake. The water was analyzed and found to be uncontaminated. The existence of frogs, snails, and ducks in and around the lake added credibility to the water analysis.

Approximately 800,000 gallons of water were pumped from the lake before the first items were discovered (figure II-10). After drainage, the lake bottom was cleared. All recovered items were decontaminated, burned, and buried in the two selected disposal pits on Gerstle River Test Site. The mine sweeping (figure II-11) method gave a high assurance that all metal items located to a depth of 3 to 4 feet below the lake bottom had been removed. Table 11-3 is a list of types and quantities of items recovered from Blueberry Lake. All munitions removed from the lake were demilitarized at site (figure II-12).

A joint Arctic Test Center/Deseret Test Center (ATC/DTC) cleanup operation (Appendix G) was conducted during the period of 13 August to 8 September 1970 to remove all residue in two pits on permanent federal property. Removal of residue from the leased land was given top priority. At grids 10 and 11 of the leased land, located near milepost lateral 1402, two pits were opened, grids were removed, towers were dismantled, and residue from the CP area was hauled to the Gerstle River Test Site receiving pit (figure II-6).

One hundred and sixty-three 5-ton dump truckloads of dirt plus refuse material (using the military standard 5-ton dump truck) were hauled from the pits to the receiving pit area at Gerstle River Test Site.

Sixteen 1-ton and four 5-ton loads of debris were taken from the ground surface at the CP (spruce and aspen grids), and from the tower launch site. Most of this material consisted of wood stakes that were used to identify the sampling and instrumentation grids.

In grid 9 of leased land located off milepost lateral 1408, three pits were opened and debris removed to the new receiving pits at the Gerstle River Test Site. In addition, surface debris was also moved to the new pits. Fifty-five 5-ton dump truckloads of material were removed from the grid 9 area. Pits in grids 3, 4, 5, 6, and 7 (Elk Hunt I and II), located in U.S. Army Gerstle River Test Site, were also opened and the material removed to the new pits. One hundred and thirty 5-ton loads of test residue were removed from the Elk Hunt I and 11 CP pits, and 281-ton loads of surface debris were removed to the central receiving pit.

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Grid 8 (Devil Hole, program 126; Swamp Oak, program 125; and Sundown, program 203) contained three pits in addition to a quantity of surface test residue. During the cleanup of this area, three live munitions were found and destroyed. sixteen loads of material were removed from the area by M113 tracked vehicles and transferred to receiving pits.

Presently there are two burial pits located on Government property at the Gerstle River Test Site. One pit measuring approximately 80 by 160 yards is located 1 1/4 miles northwest from the Chemical Testing Facility or Gerstle River CP (figure II-7). The other pit measuring 100 yards long by 125 yards wide is located 50 yards east of Blueberry Lake (figure II-8). These two pits contain all of the residue and debris gathered from old disposal areas located throughout the 97,574 acres of the Gerstle River Test Site. Appendix H is a copy of the TECOM "After Action Report of Relocation of Scrap Material at Gerstle River, Alaska," dated September 1971.

b. Delta Creek

After the successful completion of the testing outlined in table II-2, most of the test facilities and equipment were left on site for subsequent tests. When these tests were cancelled, extensive cleanup operations were conducted. The area was policed and all material was placed in a pit measuring 100 feet long by 20 feet wide by 12 feet deep located on the Caribou site (near Jamesway Building, figure II-4).

Ecological field studies were continued long after testing was terminated to assure that there had been no adverse impact to the area

An overflight of the area has revealed that a few 55-gallon drums are still scattered throughout the area. Although this is not contaminated material, the Commander, U.S. Army Cold Regions Test Center. stated that the remaining drums would be airlifted from the Delta Creek test area and the area policed.

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Table II-3. Items Recovered and Demilitarized

from Bottom of Blueberry Lake

105mm Projectile (GB)

Quantity: 44

**Lot No. SRN 66006-1-30
Serial Numbers: 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14,
15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25,
26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36,
37, 38, 39, 40, 42, 43, 44, 46, 48
(1-48 less numbers 10, 41, 45 and 47)**

M55 Rockets (GB)

**Quantity: 3
Lot No. 4012-32-15A NTV 62
Serial No. None**

155mm Projectile (GB) (No Serial Numbers)

a. Lot No. 5617-19-1 (Modified with valve and gauge) .Quantity: 91

b. Lot No. 6617-26-1
Quantity 58

c. Lot No. 1031-32-11-1
Quantity: 3

d. Lot No. Unknown (Casings badly rusted)
Quantity: 5

GA Cylinder: G8-T7-NI
HD Cylinder: No lot number

M55 Rockets (No Serial Numbers)

a. Quantity: 5
Lot No. 4017-23-114
Agent: VX

b. Quantity: 4
Lot No. 4017-23-114
Agent: GB

c. Quantity: 4
Lot No. 2011-25-276
Agent: VX

d. Quantity: 2
Lot No. 1033-43- 160
Agent: GB

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3. Installation Land Use Factors

a. Erosion Control

Because of the flat terrain at Fort Greely, the low precipitation in the area and the porosity of the basic soil, erosion is not a major problem at Fort Greely. The lack of erosion problems is explained in part by the fact that the land on which the cantonment is situated is quite flat, also the cantonment is quite small.

Some stream-bed erosion control assistance to the nearby community is occasionally required when Jarvis Creek overflows it's banks in the spring, but this is not a yearly occurrence. Likewise, on the Delta River adjacent to the artillery ranges, similar occasional bulldozing of small levees is sometimes necessary.

Fort Greely has no major problems with erosion on watercourses; however, occasionally, there is minor runoff erosion on the ski slopes.

The only area requiring a small amount of yearly effort in seeding to grass is on the Black Rapids ski slopes where minor erosion occurs. Annual reseeding and fertilizing are utilized to maintain these slopes and occasionally sod plugs may be planted along a small gully. With the care the slopes receive, the gullies that do occur do not get larger than an inch deep and an inch wide and are easily smoothed and grassed.

Throughout the year, Fort Greely is subject to an extensive amount of wind. When the ground is frozen (approximately October through April), dust control presents no problem on the post; at this time, the wind carries snow and debris. However, during the period from May through September, blowing dust is often a problem. The primary sources of the dust are river beds (Delta River and Jarvis Creek), which are generally dry during the latter summer months. The river beds are made up largely of glacial fines. Much of the wind-blown dust and sand particles are filtered out in the wooded areas between the river beds and the main post; this provides some control, especially over the larger sand particles. Although the dust is a problem, it is more of an irritation than a danger to health and welfare of the inhabitants at Fort Greely. Because of the nature of the sources and layout of the post proper, there does not appear to be any economical or practical solution to controlling the dust carried by the wind, other than maintaining screening tree cover between the sources and the main post.

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b. Trees and Shrubs

(1) Planting Plan

The Landscape Planting Plan is a separate portion of the Resources Management Plan presented in Appendix J; however, the following is a brief review of the necessity for a Landscape Planting Plan. When the main post cantonment was built in the 1950's, the climax vegetation of white spruce and quaking aspen was completely bulldozed out. Drainage landscaping was accomplished and buildings were erected. The installation was designed to be very compact with those sections that were likely to expand placed on the periphery. Only enough forest was removed to allow for construction with the result that the Family Housing backed up to the edge of the forest and the main street ended at the forest area. This circumstance means that should Family Housing or Big Delta Avenue have to be extended, trees which are not to be cut can be marked and an expansion of the landscape planting program can be avoided. Because this was not done when the original installation was built, the result was a collection of p Lain, square buildings separated by pavement and/or lawns without bushes, shrubs, hedges, or trees of any kind. A visitor's impression of Fort Greely was inevitably one of bleakness, a wartime military garrison.

Before command approval of a Landscape Planting Plan was obtained, some troop units and quarters occupants had taken the initiative to plant some trees and shrubs. These few plantings made a great improvement and stimulated command support for an all-post planting program.

The current Landscape Planting Plan, as amended (Appendix J), provides for all areas of the installation to be planted with mature trees, as many as 600 within two years. Only trees from surrounding forests will be used, and clumps and groves of these transplanted trees will be established approximating the local natural mix of white spruce and quaking aspen. These clumps and groves will be placed in all clear areas except for play areas around family housing and in public-use areas, where they may act as windbreaks and prevent the drifting of snow in parking lots, as well as make the installation a more attractive place to live. When these areas are essentially completed, trees will be placed in the vicinity of office buildings and industrial plants.

In addition to mature trees, shrubs and bushes are also being transplanted. In Appendix J is a listing of trees and shrubs being transplanted. Most: are indigenous, but some are exotic plants which do well in arctic conditions and which provide cuttings for new plants so that an initial one-time investment is all that is necessary.

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(2) Tree and Shrub Maintenance

Presently there are very few trees on the main post cantonment of Fort Greely; of those currently in place, 109 were put in during the past four years. Although a few of the trees were put in on the initiative of troop unit commander and quarters occupants, approximately 75 were put in with a hydraulic tree spade by Facilities Engineers during the past two years (as described in Appendix J).

Since trees transplanted locally are generally somewhat stunted by nature, pruning is restricted to removing dead or diseased branches and sealing the wound with tree paint. No trees are topped because, in the arctic climate, topping tends to kill the tree.

After initial fertilizing during planting, a yearly application of dry manure is made at the base of the tree. When the surrounding lawns are fertilized with 10-20-20 fertilizer, the trees also get about one half cup each.

There are no trees large enough on Fort Greely to overhang the roads nor do the aspen, birch and spruce trees, which grow here, produce much twig deadfall.

Trees which are to be removed because of death or disease are removed with the hydraulic tree spade. Depending upon the type of disease, a new tree may be placed into the same hole or nearby. If nearby, the plug taken from the new location is placed into the old hole.

Shrubs on Fort Greely are located primarily in public-use areas, as in front of the post exchange, theater, and craft shop. Before being transplanted, these shrubs were severely pruned and the wounds were sealed with tree paint. If the plant then showed minimal ill effects within two to three weeks, it was transplanted. Once growing, the shrubs are pruned yearly just after the first snowfall in October to shape them and to remove less productive parts.

c. Lawns

On lawns, parade grounds, ball fields, road shoulders, and drainageways, northern-adapted varieties of Kentucky Bluegrass, Nugget Bluegrass, and Red Fescue are planted. The fescue starts a quick soil-holding cover and is later taken over by the bluegrass varieties, forming a sound, thick rootmass. The grasses are applied at a rate of one pound

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of grass seed per 1,000 square feet and a 10-20-20 fertilizer is applied at a rate of 10 pounds per 1,000 square feet. An average of 2,000 pounds of grass seed is used annually, about two-thirds of which is Nugget Bluegrass, which is phasing out the less hardy Kentucky Bluegrass; the other third is Red Fescue.

Areas reseeded in 1976 included the ammunition storage area, which also received plugs of sod grass, and the antenna field east of the main post.

(1) Mowing

There are approximately 363 acres of lawns, 11 acres of playing fields, and 10 acres of parade grounds on Fort Greely. Appendix J indicates the acreage mowed by different means, by land use classification. Generally, all lawns are mowed weekly; parade grounds, road shoulders, and athletic fields are mowed biweekly; and minimum-use areas such as ammunition storage areas are mowed monthly or as needed. There are no cemeteries or maintained golf courses. Firebreaks are treated with weed control chemicals which have been proved to be harmless to mammals and are cropped with a brush-cutter every other year or as needed.

A copy of grounds maintenance requirements is supplied to housing occupants through the Family Housing Office, Fort Greely. This provides instructions to quarters occupants on lawn care.

(2) Fertilizing

All lawn areas usually mowed are fertilized four times per summer, roughly on the following schedule and with the following fertilizers:

First application	6-14 May	10-20-20 (N-P-K)
Second application	2-12 June	Ammonium Nitrate
Third application	6-12 July	10-20-20 (N-P-K)

Fourth application

12-18 August

10-20-20 (N-P-K)

Application rate is 10 pounds per 1,000 square feet with approximately 20 tons of 10-20-20 (N-P-K) fertilizer being used each year.

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d. Irrigation

Irrigated areas on Fort Greely include quarters lawns, playing fields, parade grounds, and plantings of trees and shrubs. Quarters occupants are responsible for watering their lawns; the units using the billets water the grass areas around troop billets. Playing fields and parade grounds are watered by Facilities Engineering personnel using a portable pipe system, while trees and shrubs are watered from a tank truck or with a hose from a building.

Starting on or about 15 May and ending in mid-September, all of these areas are watered weekly with one-half inch of water unless rain does it naturally. Thus, all areas receive at least two inches of water monthly during the spring and summer.

e. Weed and Brush Control

Very little weed and brush control is necessary on Fort Greely due to the very short three-month growing season. Where weeds do begin to take over a lawn due to lack of care by quarters occupants, the lawn may be completely retilled and reseeded. Herbicides are also used.

(1) Prescribed Burning

Burning of grass and weeds is not needed at Fort Greely as the climate does not allow the vegetation to grow enough to require it. Occasionally, vegetation on firebreaks will be disk-harrowed, or cropped, but aside from that, there is no weed or excess grass problem.

(2) Herbicides

The following problem weeds require control:

Lamb's-quarter - *Chenopodium album* (Summer annual)
Large crabgrass - *Digitaria sanguinalis* (Summer annual)
Dandelion - *Taraxacum officinale* (Perennial)
Knotweed - *Polygonum sp* (Summer annual)

The following herbicides have been used.

(a) 2, 4-D Low Volatile Ester selective weed killer. Active ingredient 94.8 percent by volume, isooctyl ester of 2-4- Dichlorophenoxyacetic acid, 5.2 percent inert. Active ingredients are 62.88 percent by weight, or 6 pounds/gallon (lb/gal).

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(b) 2, 4, 5-T brush killer,* active ingredient 83.5 percent by volume of 2, 4, 5-Trichlorophenoxyacetic acid isooctyl ester, 16.5 percent inert. Active ingredients are 6 lb/gal.

(c) Weed killer, Alkanolamine salts (of the Ethanol and Isopropanol series) of Dinitro-o-sec-. Lylphenol, 51 percent active ingredient, 49 percent inert, 3 lb/gal active ingredient.

Sterilants have never been used on installation property.

In FY1975, approximately 400 pounds of 2, 4-D were used for control of dandelions, knotweed, and lamb's-quarter. Approximately 750 pounds of 2, 4, 5-T were also used, primarily on firebreaks, and about 650 pounds of alkanolamine salts were used on roadsides. Brush-killer spraying was supplemented by mechanical cropping.

Approximately 380 acres are treated with 2, 4-D including lawns and parade fields for the control of broadleaf weeds. This chemical is used as a preemergent in May or April as weeds tend to come up during snow-melt. The 2, 4-D needs copious amounts of water to be effective. Normally, another application is made in late October to act over the winter. Approximately 440 acres of firebreaks and roadsides are treated with 2, 4, 5-T brush killer and alkanolamine salts with two to three applications per year.

Current regulations require that the use of all three herbicides must be reported on the monthly Pest Control Summary Report (DD Form 1532) and the Annual Installation Natural Resources Report (DA Form 2785-R). Reporting the use of pesticides by agricultural lessees is not specifically required at the present. The policy has been to report only pesticides used by the Facilities Engineer in his maintenance operations including applications by contractors. Clarification of this matter is expected in the near future and it is anticipated that all pesticides used on the installation, regardless of the user, will be reported. Appendix K lists pesticides, fungicides, and herbicides that may have to be reported when used at Fort Greely.

f. Environmental Impact Assessment

An assessment of the environmental impact caused by day to day operation of U.S. Army Cold Regions Test Center is provided in Appendix L.

***Note: 2, 4, 5-T is not authorized for use around populated areas where humans may come in contact with it.**

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An assessment of the development of a bison habitat at Fort Greely is provided in Appendix F.

g. Fish and Game Resources

An agreement concerning the development and management of fish and game resources at Fort Greely is provided in Appendix M.

4. Legal Claims

In the early 1970's, the Gerstle River Test Site at Fort Greely became a matter of controversy for Alaskan politicians in Washington, D.C. The discovery that the U.S. Army had conducted chemical and biological tests at Fort Greely initiated an intense investigation. Numerous articles appeared in local papers, federal releases, and national television accusing the U.S. Army of being responsible for the deaths of various animals in Delta Junction, Alaska, approximately 10 miles from Fort Greely. Newspaper articles also accused the U.S. Army of being responsible for the paralysis of two children in Fairbanks, Alaska, and an outbreak of tularemia in Vermont in 1968, in addition to many other accusations. There has been no evidence or scientific proof to link the Alaska tests with any of the above accusations .

Through 1972, all legal claims were handled by the SJA Office at Fort Greely. Since 1972, all Alaskan complaints have been handled by the SJA Office at Fort Richardson, Anchorage, Alaska. The SJA Office at Fort Richardson indicated that the U.S. Army has had no lawsuits or complaints filed against Fort Greely since Fort Richardson has been assigned the responsibility of handling all Alaskan legal actions. The SJA was not aware of any past lawsuits filed against the U.S. Army and stated that presently there are no litigations pending. All claims prior to 1972, if any, should be on file at either the U.S. Army Claims Service at Fort Meade, Maryland, or the Office of the Judge Advocate General (OTJAG), Litigation Division, Washington, D.C.

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III. FINDINGS

Based on the evaluation of information available during the RIR study, the following findings are presented

- 1. The records and personnel interviews indicate that contaminant migration at the Gerstle River Test site is not a problem since (a) the decontamination procedures used before burial of scrap test materials were thorough and complete, and (b) the soil and moisture characteristics at the site are such that even if contaminants were present, leaching of contaminants into the groundwater is unlikely. The Test Site is located in a remote area with no adjacent homesites. The land is unsuitable for agricultural purposes.**
- 2. Records covering incoming material for the 1953—1958 time frame are incomplete. An accurate accounting on all material shipped into the Gerstle River area for function and surveillance testing is not available. However, interviews with responsible personnel indicate that all munitions subjected to surveillance testing were properly demilitarized. Although all rounds drawn for functional tests were reportedly accounted for with the possible exception of one 155 mm round, it is considered possible that other unexploded ordnance munitions and submunitions may be found at the Gerstle River Test Site.**
- 3. The records indicate that the Gerstle River Test Site is not contaminated by radiological or biological agent materials. A deep well was prepared and instrumented for use as a radiological material disposal well, but it was never used for this purpose.**
- 4. Two fenced disposal pits are located in the Gerstle River Test Site. These pits were opened in 1970 and contain residue and debris removed from all known disposal pits in the Gerstle River area. The pits were closed in 1971 after receiving scrap material from pit near Blueberry Lake. Over 400 truckloads of material (dirt plus refuse) were placed in the two pits. Refuse included scrap metal, test vehicles, grid instrumentation, protective clothing, and uncontaminated garbage. The refuse was decontaminated by incineration and chemical treatment before burial.**
- 5. The records indicate that the Delta Creek area of Fort Greely was used for biological agent testing from 1962 through 1967. Ecological studies were conducted at Delta Creek after testing was completed to assure that active biological materials did not remain at the site.**

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IV. CONCLUSION

Based on available records, it is concluded that a preliminary survey of the Gerstle River Test Site is not required.

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V RECOMMENDATIONS

- 1. Whether or not the property is retained by the Army, consideration should be given to opening the two disposal pits at the Gerstle River Test Site, examining the decontaminated rubble, and move it to Fort Greely for disposal in the normal manner prescribed for industrial waste. If the Gerstle River Test Site remains in Army possession, consideration should be given to the removal of the warning signs and fences around the pit areas since these only attract the attention of unauthorized curiosity seekers. The area perimeter fences should remain intact to discourage penetration by unauthorized personnel.**
- 2. Should it be decided to "excess" the Gerstle River Test Site property, it is recommended that the area be swept by an explosive ordnance disposal team to remove large shrapnel fragments and possible UXO's. One 155mm HE round was reported to have malfunctioned in this area and it is possible that other UXO's are present since during one of the cleanup operations, three live rounds were discovered.**

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Project Chariot

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Project Chariot: Nuclear Legacy of Cape Thompson

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[Reprinted from the Proceedings of the U.S. Interagency Arctic Research Policy Committee Workshop on Arctic Contamination, *Native People's Concerns about Arctic Contamination II: Ecological Impacts*, [1993] Anchorage, Alaska]

Author's note: Much of the information presented in this report is derived from unpublished materials contained within the files of the Bureau of Land Management (BLM). Many of the unreferenced quotations presented here are taken from letters and other correspondence found within these BLM files.

Introduction

In July of 1945, in the hot, arid desert near Alamogordo, New Mexico, a new age of man began. History might call this the Atomic Age, or The Age of Cybernetics, the Age of Science, or whatever. This new age has brought man the power to move mountains, excavate enormous canals, change the channels of huge watercourses, exert meteorological controls, modify weather by technological activity, create vast reservoirs or destroy them, or bring death to millions of our fellow man in a blinking of an eye.

The late President Kennedy spoke to the National Academy of Sciences in October of 1963, saying, in part, "Science today has the power for the first time in history to undertake experiments with premeditation which can irreversibly alter our biological and physical environment on a global scale... The Government has the clear responsibility to weigh the importance of large scale experiments to the advantage of knowledge or to the national security against the possibility of adverse and destructive effects ..." (Wilimousky and Wolfe, 1966:VII).

The dropping of atomic bombs on Hiroshima and Nagasaki brought a dramatic ending to the war between the U.S. and Japan. The invention of these nuclear weapons set a thousand scientific minds into motion, not the least of which was Edward Teller, the inventor, or "Father of the H-Bomb."

Edward Teller toured the territory of Alaska in the summer of 1958 to promote his dream of "engaging in the great art of geographic engineering, to reshape the earth to your pleasure." He told the curious Alaskans that they were "the most reasonable people," that the atomic scientists had "looked at the whole world" for just the right location to test their technology. He

flattered them, saying that "Anything new that is big needs big people in order to get going..., and big people are found in big states." He boasted that the Atomic Energy Commission (the predecessor to the Energy Research and Development Administration, and now the Department of Energy) could "dig a harbor in the shape of a polar bear, if required." He further boasted that "If your mountain is not in the right place, just drop us a card." (Coates, 1989).

In mid-1958, with worldwide pressure building to ban nuclear weapons testing, the AEC announced the "Plowshare Program." Plowshare would attempt to harness the nuclear beast and transform it into a peacetime workhorse. The first operation of Plowshare would be "Project Chariot," an experiment "to provide scientific and engineering data for excavation projects." The AEC hoped the experiment would be a prelude to the excavation of a new, sea level Panama Canal. The "harbor" would be used to transport coal from deposits on the north side of the Brooks Range. The logistics of this proposal were not a concern to Edward Teller. Alaskan business leaders pointed out that the harbor would be ice-locked by the frozen Chukchi Sea for nine months of the year. Teller replied that the warehouses would be built to store the coal until the shipping season. When they asked how he planned to get the coal to the harbor, he said a railroad would be built. George Rogers, a long-time Alaskan and Harvard-educated economist, recalling this conversation, was astonished at Teller's answers to these questions. Rogers remembers asking Teller if he had any idea what such a project would cost, whereupon Teller abruptly changed the subject and inquired as to where he might buy souvenirs (O'Neill, 1989b:30-31). This motive aside, the AEC was seeking specific information on 1) cratering laws; 2) the effects of raw charges in the nuclear yield range; and 3) the effects of radioactivity, air blast and seismic shock on the environment near the site (AEC, 1963).

The environment of the site was a subject in and of itself. By the conclusion of Project Chariot in August, 1962, more than 40 bioenvironmental studies had been carried out. These studies represented the most comprehensive assessment of a single area ever done as a prelude to a proposed project. According to O'Neill (1989b:35), the compilation of these studies, titled *Environment of the Cape Thompson Region Alaska* (Wilimousky and Wolfe, 1966) was the first genuine environmental impact statement.

Edward Teller and the AEC drew on the popular image of Alaska as a barren wasteland. They referred to the future harbor site as "located in the wilderness, far away from any human habitation." The Anchorage Daily Times editor, Robert Atwood, agreed and said, "It is a wilderness with no trees, no nothing! Nobody would want to live there." It would be two years until the AEC bothered to actually talk to the people who would most be affected by Project Chariot, the residents of Point Hope - an Eskimo village just 30 miles from ground zero (O'Neil, 1989a).

Physical Geography of the Ogotoruk Valley

The site chosen by the AEC for Project Chariot was at the mouth of Ogotoruk Creek, located at

latitude 68° 06' N. & longitude 165° 46' W. The site is about 100 miles north of the Arctic Circle, and about 125 miles northwest of Kotzebue. The Chukchi Sea, adjacent to the site, is shallow. The Chukchi Sea is part of the margin of the Arctic Basin extending southward between the continents of Asia and North America. Northward flow of water through the Bering Strait has shaped many of the coastal features and controls the distribution of sediments. The temperature and salinity conditions in this area are determined by the properties to the south of the strait, and the same general statement applies to many of the marine plants and animals. In the summer, inshore temperatures reach 50 F. (Wilimousky and Wolfe, 1966:701-702).

The Ogotoruk Valley is about two miles wide at its lower end. The ridges that form its walls rise to elevations of more than 700 feet, with high points rising another 100 feet and more. The valley extends into the Chukchi Sea along the same axes, and is called the Ogotoruk Seavalley. The Seavalley gradually narrows to about 1 1/2 miles wide at a depth of 85 feet, and can be traced for a distance of 15 miles to a depth of 135 feet. Both valleys are primarily cut into relatively soft siltstone flanked by more resistant rocks (Wilimousky and Wolfe, 1966:789-791).

The Chariot site lies entirely in mudstones of the Ogotoruk Formation of the Jurassic or Cretaceous Age. The site is underlain by permafrost extending from within one foot of the surface to depths of about 1,165 feet inland and 945 feet near the coastline (Wilimousky and Wolfe, 1966:85).

Ogotoruk Creek is the major creek in Ogotoruk Valley and, except for Tumi Creek, all of the creeks that rise in the valley are tributary to it. Ogotoruk Creek is 11 1/4 miles long and rises at about 800 feet on the west flank of Sigrikpak Ridge. Like many of the small creeks that flow into the Chukchi Sea, the mouth of Ogotoruk Creek is closed occasionally by a barrier bar of beach gravel moved by alongshore currents during offshore storms. A lake forms behind the barrier bar, and water percolates through the permeable gravel into the sea. When an onshore storm occurs, the runoff of the creek fills the lake until the barrier is breached by the rising water. The creek stays open until sealed by another storm (Wilimousky and Wolfe, 1966:55).

The Ogotoruk Valley is an exceptionally windy area. The topographic features of the valley channel cold air from the northeast around the western end of the Brooks Range, and this results in lower precipitation and lower temperatures than those at Cape Lisburne to the north. This cold-air channeling, combined with the frequent northerly winter gales, prevents heavy snow accumulation. The cool waters of the Chukchi Sea depress summer warming of the air and soil and thus help to keep the level of permafrost at shallow depths, especially in the lower parts of the valley. Temperature extremes range from the mid-70's (F) in the summer to the -40's (F) in winter (Wilimousky and Wolfe, 1966:45).

Flora and Fauna of the Ogotoruk Valley

The valley floor is covered with tussock heath vegetation and occasional groups of low willows. There are no trees; it is an area of true tundra. There are broad wet meadows, dry fell-fields, talus slopes, precipitous cliffs, rock outcrops, gravel bars and benches. These habitats support about 300 species of vascular plants, 100 byrophytic species, 81 lichens, and an undetermined number of fleshy fungi (Wilimousky and Wolfe, 1966:277).

The marine mammals of the area migrate within just a few miles from where Ogotoruk Creek empties into the Chukchi Sea. Various species of seal and whale, as well as walrus and polar bear are established. Most Eskimo subsistence hunting takes place in the spring between Point Hope and Cape Thompson (Wilimousky and Wolfe, 1966:880-881).

The Chariot site is situated just outside the northward limit of the area of important salmon production on the arctic coast of Alaska. Ogotoruk Creek has a very small salmon population; a gill net used in the sea in front of the creek during the 1960 studies caught chum, pink, sockeye, and a single chinook salmon. The destination of these fish can only be speculated upon (Wilimousky and Wolfe, 1966:871-873).

The sea cliffs in the Cape Thompson area support over 400,000 sea birds. Crowbill Point, the sea cliff adjacent to the Chariot site, is residence to almost 7,000 sea birds, which include cormorants, gulls, murre, guillemots, and puffins (Sowls, 1992).

The terrestrial-mammal fauna of the Ogotoruk Creek-Cape Thompson region consists of 21 known species. These include shrew, bear, wolf, fox, ermine, weasel, wolverine, squirrel, marmot, vole, muskrat, lemming, porcupine, moose, and caribou. Coyote, mink, river otter, and lynx are also known to occur in the area (Wilimousky and Wolfe, 1966:519-523).

Because the Ogotoruk Valley is so windy, which keeps the ground relatively clear of snow, the region is a very important wintering area for caribou (Wilimousky and Wolfe, 1966:557).

Man and the Ogotoruk Valley

The permanent settlements nearest to the Chariot site are Point Hope to the north, and Kivalina, about 45 miles southeast. The length of time that Kivalina has been occupied is not known; Point Hope, from archaeological evidence, appears to have been a site of Eskimo occupation for almost 2,000 years. The Eskimo name for Point Hope is Tigaraq, which means index finger. It remains a strategic point for the hunting of whales as they migrate through the Bering Strait.

The Ogotoruk Valley has never been the site of a permanent Eskimo population, although it has been seasonally occupied for thousands of years by Eskimo hunters. There are four obvious reasons for this intermittent occupation: (1) There is no lagoon large enough to allow sealing or fishing to become important activities, (2) the creek itself is of insufficient size to act

as a major salmon spawning stream, (3) the valley, while an important wintering ground for caribou, is too small to support large numbers of caribou for extended periods of time, and (4) its proximity to the village of Tigaraq (Point Hope) (Wilimousky and Wolfe, 1966:964).

The Ogotoruk Valley, while relatively insignificant as a settlement in itself, can be equated with the outlying fields of a large farm. A hunting, fishing and gathering economy requires a very extensive area of production. The presence of bird cliffs continues to draw Tigaraq and Kivalina villagers seeking murre eggs, as does the presence of the migrating caribou.

Archaeological remains present in the Ogotoruk Valley were investigated in 1959-60 in the order of their proximity to the crater that would result from the proposed nuclear explosion. Two of structures were houses which had been occupied so recently that their former owners were known: Wilfred Lane of Point Hope and Charles Jensen of Kotzebue.

Wilfred Lane was born on August 5, 1940 at Point Hope. His affidavit, in conjunction with his application for a native allotment in 1972 for the Chariot site, states that he had been going to the Ogotoruk Valley with his father since he was 4 or 5. His father had a reindeer herd and built the aforementioned sod igloo "house" at the site. Wilfred gathered eggs and hunted caribou there every year as he got older. He also caught "salmon or whitefish in that stream," and hunted ducks. He would make two to four trips a month, "staying about two to three days each time."

His affidavit further reads: "When the government first began building on my land, all the people from Kivalina and Point Hope complained about the project. I didn't specifically complain that it was my land, since we all were fighting together. Of course the government went ahead and did the building anyways. After I moved to Kotzebue (when he was 21), I used the land less, but I still used it every year. I go to Pt. Hope whaling every year, and on the way back in April, I stop and go hunting at my land. I often go back egg hunting in the summer. When I heard about the Native Allotments, I chose this land because it had always been my family's land before me and because I always used it. That is very good hunting land still."

Project Chariot and the "Tracer Experiment"

On June 9, 1958, the Bureau of Land Management received an application from the AEC to segregate lands in northwestern Alaska to "conduct extensive environmental studies." Notice of the Proposed Withdrawal was published in the Federal Register three months later. In February, 1959, a public land order (PLO) was drafted and went through surnaming, but was never signed or published. The Notice of Proposed Withdrawal was amended on April 30th of that year, upping the acreage to 1,024,000. Three weeks later, the AEC requested a permit to enter the area so that they may begin conducting their studies. The permit was approved on June 1, 1959 and was valid for 18 months. The AEC began immediately constructing housing for laboratories, sleeping and eating quarters for a staff of almost 90 people. Five of the

buildings were of a permanent frame type, and the rest were of the "Jamesway" variety. Three gravel airstrips were also constructed, the largest of which was 2,200 feet long (AEC, 1959).

On December 21, 1960, the AEC requested a 3-year extension of their permit. By this time, Alaska had been a state for almost two years. Public opinion on Project Chariot was greatly divided. The Fairbanks Daily News-Miner editor, George Sundberg, wrote "We think the holding of a huge nuclear blast in Alaska would be a fitting overture to the new era which is opening for our state." On the other hand, the scientists, many from the University of Alaska at Fairbanks, were learning that the Eskimos, who were dependant on hunting caribou in the huge test area that was Project Chariot, were inexplicably showing high levels of harmful radionuclides in their bodies. The Caribou, and the Eskimos who ate them, appeared "to be higher in Sr 90 (Strontium 90) content than any other group in the world. " Worldwide nuclear testing, it was shown, was causing fallout that was being absorbed by lichen, a rootless tundra plant that derives its mineral nutrition from airborne dust. As the caribou grazed on the lichen, they gleaned fallout from many acres and retained it in their tissues and bones. When an Eskimo ate several caribou each year, he further concentrated in his body the Strontium and Cesium once scattered over miles of tundra (O'Neill, 1989b).

Some of the scientists now voiced opposition to the Project. Two individuals were subsequently relieved of their positions, while others were blacklisted from working in their fields elsewhere. But together with the residents of Point Hope and a handful of dedicated conservationists, they raised to an unacceptable level the political cost of proceeding with the detonation of nuclear bombs at the Chariot site. It was then decided to conduct the cratering test in the Nevada desert in July of 1962 (O'Neill, 1989a).

Since the AEC couldn't explode their bombs at Ogotoruk Valley, it was decided to bring fresh radioactive fallout to the valley. Piper (1963) estimated that 26 milliCuries (mCi) of isotopes and mixed fission products were transported to the Chariot site. This included a maximum of: 10 mCi of mixed fission products from a site in Nevada (described below), 6 mCi of Cesium 137, 5 mCi of Iodine 131, and 5 mCi of Strontium 185. This was to be an "experiment related to the dispersal, in an hydrologic environment, of radioactive products from a buried nuclear explosive" (USGS, 1962). The experiment would answer a question the AEC had posed to the United States Geological Survey (USGS): Would the bombs contaminate local drinking water? USGS scientist, A.M. Piper, answered the AEC in a report in November, 1961, concluding that "under some situations, effects...could be substantial and a serious handicap to Man's activities." The AEC wanted proof, and they assigned Piper to conduct experiments at the Chariot site (Magdanz, 1992).

The design of the experiment was this: Scientists from USGS would apply known amounts of radioactive fallout to measured plots of ground at Ogotoruk Valley. They would water the plots, to simulate rainfall if it wasn't raining at the time, and catch the water as it trickled off. In the lab, they would measure how much radioactivity was in the water. A USGS Professional Paper containing a complete description of the experiment was published in 1966 (Piper, 1966).

To acquire radioactive fallout, a USGS chemist from Denver, V.J. "Vic" Janzer, travelled to Nevada to where the cratering test, called "Project Sedan," was being conducted. He placed a ring of trays in a one mile radius around ground zero, and collected them 24 hours after detonation. He brought 17.5 pounds of this radioactive fallout - sediment, sand, and dust - to Ogotoruk Valley on August 20, 1962 (Oral comm. James Magdanz, 1992). In addition to this 17.5 pounds of material were small segregated quantities of Iodine 131, Strontium 85, and Cesium 137 mixed with sand (Oral comm. Dan O'Neill, 1993) .

On August 21, a windy Monday, four men including Janzer, left the Ogotoruk Creek camp in one of the half dozen "weasels." They drove across the tundra to the first tributary, Snowbank Creek. They set up a gasoline-powered pump near the creek bed, and attached several garden hoses equipped with plastic spray nozzles.

By Thursday, they had completed seeding and watering 10 square plots, varying in size from 24 x 24 inches to 60 x 81 inches. These plots were located at various elevations along Snowbank Creek. At Site #116 a soil infiltration and seepage experiment was performed, and at site #117, located along a tributary of the creek, "tracer" material was actually injected directly into the stream, and water samples were gathered at 20, 40, and 60 feet downstream to show dispersal (Piper, 1962).

At the conclusion of the experiments, they collected the beakers, boards, and plastic and carried them to a burial site midway between plots 113 and 114 at the lower end of Snowbank Creek. The contaminated soil, rocks, and plants, totalling about 15,000 pounds, was removed from the 11 plots, placed in 55 gallon drums and transported to this same burial site, where the drums were emptied. The resulting spoilage pile was approximately four feet high and occupied an area of about 400 square feet. An additional layer of dirt approximately four feet thick was placed over the contaminated soil using a bulldozer (Baker, 1963).

The bottles of run-off and any left over radioactive material were flown to Denver for analysis (Piper, 1963). This represented about 2% of the originally introduced material. The sites were inspected five days later, and the verdict was that neither the cleared plots nor the mound posed any health risk. However, there were "possible items of non-compliance." (Magdanz, 1992)

The scientists had used Iodine 131, Strontium 85, and Cesium 137 which were not permitted according to the USGS license, and the quantities of radioactive isotopes buried in the mound were larger than permitted Perhaps as much as 1,000 times more strontium and cesium as allowed by federal regulations (Piper, 1963 and Magdanz, 1992). Also, the BLM permit to the AEC did not allow the use of radioactive materials (Magdanz, 1992).

These charges were eventually leveled at the acting Director of the USGS in Washington, D.

C., Arthur Baker. Baker argued in a letter to the AEC dated February 28, 1963, that the radioactive material had been dispersed to harmless background levels, and "the extreme cold coupled with the permafrost in the area causes disturbed ground to freeze solid early in the winter and to remain frozen. (Author's note: The top one to two feet thaws in the summer and freezes again in the fall.) It is believed from previous experience in the area that the dispersal mound is now frozen solid and that the portion of the burial mound containing the waste material will remain solidly frozen and inaccessible for many years, barring a drastic climatic change." Also, "The Chariot Base Camp is the only facility in the region that could possibly be affected by leakage from the spoilage pile..." and "any radioactive material released would be carried to the creek by surface run-off and then to the sea. " "It is our opinion that . . .this material does not constitute a hazard." A memo dated April 10, 1963 from the AEC's Director of Special Projects in San Francisco stated that the AEC felt..."satisfied that the radioactive waste mound at the Chariot site does not represent a health and safety problem...it can be abandoned," which it was.

A letter from the Assistant Secretary of the Interior, John A. Carver, Jr., to the Chairman of the AEC, Glenn T. Seaborg, dated May 14, 1963, stated in part, "We note that you have supplied the Manager with maps showing where these areas (tracer experiment plots) are located. To the extent that the nature of the use to which the study plots are being devoted, may not be readily apparent to members of the public, we suggest that they be appropriately posted." The burial mound was finally posted by U.S. Fish and Wildlife Service employees in the winter of 1992.

Epilogue

The AEC came to the village of Point Hope on May 14, 1960, and played an 11-minute film for the curious residents showing a stylized representation of the lower Ogotoruk Valley before and after the simultaneous detonation of one 1-megaton, and two 200-kiloton thermonuclear bombs buried at shallow depth. The bombs were arranged in a "keyhole" shape, and the clouds of debris resulting from the explosion would rise to an estimated 30,000 feet. The blast would be equal in energy to 160 Hiroshima bombs. It was shown in this dramatic film, that the sea would rush into this keyhole-shaped crater, creating an instant harbor (O'Neill, 1989b). The villagers would not only be invited to watch the blasts, but would be employed as coal miners, railroad and harbor operators. The AEC was trying to entice them into cooperating with Project Chariot. They were told that all the people living in Point Hope, Kivalina, and Noatak would be temporarily relocated to Kotzebue or Nome for a year or so after the blast. They would then be relocated again, not back to their original homes, but to modern dwellings near the brand new harbor in the Ogotoruk Valley (Rock, 1962). The now very concerned residents of these native villages began their vocal opposition to Project Chariot. Their strong leadership led the way to Native political organization. The first-ever meeting of the Alaska Eskimos convened in Barrow in 1961 as a direct result of Project Chariot. That same year, the first statewide Native newspaper, 'The Tundra Times,' was established, with Howard Rock as editor. The Point Hope villagers also sent a protest to President Kennedy, saying that Chariot is too close to our

homes at Point Hope and to our hunting and fishing areas." (Coates, 1989). This flurry of activism marked the beginning of an era of political maturity for Alaska Natives which led to a successful resolution of their land claims in Congress in 1971.

The handful of Alaskans who rallied together and spoke out against Project Chariot achieved the first successful opposition to the American nuclear establishment. According to O'Neill (1989a), it marked one of the first battle victories of the new "environmentalism" era. This perhaps was the most significant result to come out of all four years of studies performed in conjunction with Project Chariot. < p> In August of 1962, after the "tracer" experiments had been completed and after spending \$3 million on Chariot, the AEC announced its decision to defer a recommendation to the President that the project proceed. They also decided that they no longer needed the over 1 million acres asked for in the original withdrawal application. In January of 1963, they formally requested that only the 96,000 acres which surrounded the Ogotoruk Valley, be withdrawn. However, in April of that year, they changed their mind and decided to withdraw their application, with the understanding that the AEC may wish to re-file in the future, in the event a decision is made to carry out Project Chariot. The letter stated that "The bioenvironmental studies as related to Project Chariot were phased out on 9/01/62" but that "long range studies of the effects of worldwide fallout on the arctic ecology will continue (Seaborg, 1963)." In the end, Chariot had failed for want of horses to pull it.

That September, the BLM requested from the AEC an exact description of land-use sites for future protection of the Government's interest. Additional requests to the AEC were made, but no response was ever received.

In December of 1966, the Department of the Navy assumed control of all the AEC improvements in the Ogotoruk Valley and obtained a BLM Special Land Use Permit (SLUP), effective for five years. 4,700 acres became identified as the Cape Thompson Naval Site. < p> In 1966, the USGS published the results and conclusions derived from the tracer experiments of 1962 (Piper, 1966). A.M. Piper, analyzing the effects on local water supplies wrote: "All villages of the area are outside the fallout sectors of the foregoing appraisal; accordingly; their established water sources would be exposed only to stream-transported or wind transported fission products from Project Chariot. Two of the villages, Kivalina and Noatak, definitely would be so exposed." Also, "However, trail-side water sources should be considered "off limits" until proven otherwise by adequate radiochemical analysis, especially in the basins of Ogotoruk Creek, Nasorak Creek, and the several small streams southeastward to Cape Seppings" (Piper, 1966:33).

The site was used as a logistical support base for the Naval Arctic Research Laboratory (NARL). The Navy maintained the buildings at the old Project Chariot base camp, and utilized them as living quarters, shops, garages, and generator facilities. The three airstrips were also re-worked and improved.

When the Special Land Use Permit expired in December of 1970, the Ogotoruk Valley fell into a very intermittent use status. Wilfred Lane (1983) wrote, "...it seemed like the Government had abandoned the site. No one uses that land except for me and occasionally my brothers."

In March of 1972, the entire township containing the Project Chariot base camp was withdrawn by Public Land Order 5179, subject to "valid existing rights" concerning addition to or creation of units of a National Park, Forest, or Wildlife Refuge. One month later, Wilfred Lane formally filed his native allotment application for 160 acres surrounding the Project Chariot base camp, including the airstrips.

Two years later, the Navy filed an application for withdrawal for the 4,700 acres located within their former SLUP. The Alaska Native Claims Settlement Act had already been signed into law, and the BLM asked the local Native Regional Corporation if they intended to select these lands. The Arctic Slope Regional Corporation formally filed their selection for the Ogotoruk Valley in March of 1975.

In October of that year, the Navy indicated that they assumed control of the 4,700 acre portion of Project Chariot and the camp. The Navy considered the area to be "an important off-site component of NARL," and that they were "interested in continuing arctic coastal and beach studies as they pertain to coastal and inshore warfare and research programs..." They also indicated that "Old diesel oil spills at Cape Thompson have, for example, given ecologists the opportunity to study the effects of oil spills on the structure and functioning of arctic tundra ecosystems." The Navy indicated that they strongly supported segregation of these lands from Native selection. Rather, they supported the proposal that after withdrawal by the Navy had been accomplished, the 4,700 acres would become a "National Environmental Research Park" (Kermes, 1975). By this time, the AEC had become the Energy Research and Development Administration (ERDA). A letter from the ERDA to Dave Fauske of the Arctic Slope Regional Corporation (ASRC) explained the concept of this "research park." "Of primary importance to the definition and operation of one of these research parks is the fact that it is a pristine undisturbed virgin environment held forever inviolate from man's disturbance like Mount McKinley National Park." And "Just as our research park at Savannah River studies the impacts of operating nuclear reactors and waste burial grounds, so a similarly designed park in the arctic region could study the environmental impacts of oil or natural gas wells, coal or mineral mining or deep water port developments" (Brisbin, 1975). Apparently, as late as October of 1975, the scientists at ERDA had still not given up the idea of excavating a "deep-water port" at the Ogotoruk Valley.

In March of 1976, an agreement between ASRC, the Tigara Corporation (Point Hope Village Corporation) and the Secretary of the Interior, outlining the establishment of this "National Environmental Research Park" was drafted. It has never been signed.

On December 2, 1980, the Alaska National Interest Land Claims Act was passed, and the

Ogotoruk Valley was included in an area designated the Cape Thompson Subunit of the Chukchi Sea Unit of the Alaska Maritime National Wildlife Refuge. The Fish and Wildlife Service (FWS) would now have jurisdiction over much of the old Project Chariot lands, although the Navy application for withdrawal of the lands, the ASRC land selection, and Wilfred Lane's Native Allotment application were still valid and remained active.

In February of 1982, the State of Alaska filed a general purposes grant selection for lands in the Ogotoruk Valley including the Project Chariot base camp. Meanwhile the FWS formally requested that the U.S. Army Corps of Engineers investigate and report on the need for cleanup of hazardous waste within the Cape Thompson Subunit. Site visits were conducted by the Corps in September of 1985 and 1987. They reported that "hazardous toxic waste is present at the site (U.S. Army Corps of Engineers, 1987). Environmental and archaeological studies were also conducted during the visits. Building materials suspected of containing asbestos were collected during the 1987 site visit. Friable asbestos is present at the site." In addition, "sampling results have identified petroleum, oils, and lubricants (POL's) at the site which exceed environmental and health standards criteria." The petroleum products and abandoned oil drums were cleaned up by the Corps in 1990.

In the March of 1984, a letter from the Navy to the BLM stated that "The Navy has no record of any Navy-owned improvements ... and has no interest in any equipment or improvements on ..." the Project Chariot site. This was in sharp contrast to their extreme need for withdrawal of the area just nine years earlier.

Wilfred Lane's native allotment for the Chariot Site was approved in January of 1987, and was subsequently surveyed. His patent was issued in 1990, and easements reserved to the U.S. were for a trail along the beach through the allotment, a trail from the beach to the main camp and camp airstrip, and for the large runway on the east side of the allotment. In April of 1992, Dan O'Neill, a University of Alaska Fairbanks researcher, who is writing a book about Project Chariot, obtained recently de-classified documents and letters under the Freedom of Information Act. The government archives described the burial of soil contaminated with radioactive material in August of 1962, in conjunction with the Project Chariot scientific studies (Blucher, 1992). The discovery came at a time of increasing concern over disposal of radioactive waste in the Arctic. Although the FWS has jurisdiction over the property, the Department of Energy has assumed responsibility for the clean up (Phillips, 1992b).

On September 15, 1992 Governor Walter Hickel and Senator Frank Murkowski visited Point Hope and the burial mound just north of the abandoned Project Chariot base camp. They were accompanied by Wilfred Lane and Richard Parrish, a contaminants specialist from the Army Corps of Engineers. Both Hickel and Murkowski promised immediate action and indicated that any residual waste would be removed and the site cleaned up by March 1993 (Phillips, 1992b).

When the Army Corps of Engineers first investigated the site five days earlier, they first flew

over the area taking radiation readings with a sensitive radiation counter. With no unusual indications of radiation from the air, they landed. But two days later, in a two-foot-deep hole on the mound believed to be the burial mound, radiation counters began to detect low levels of radiation. The officials retreated, and Point Hope and North Slope Borough leaders called for immediate action to secure the site and remove the radioactive materials. They hired a private consultant to advise them (Phillips, 1992a).

The natives of Point Hope have experienced a high rate of cancer related deaths in the last 30 years. It was immediately assumed that the tracer experiments performed and the burial of radioactive waste 31 years ago is a possible cause of these deaths. The eight cancers that were diagnosed in Point Hope residents from 1984 to 1989 included two cases of lung cancer, two cases of cervical cancer, and one case each of stomach, bone, colon and testicular cancer. The common types of cancers associated with radiation exposure among Hiroshima and Nagasaki bomb survivors and others with known radiation exposure have included thyroid cancers, leukemia, multiple myeloma, and breast cancer in females. None of these cancers was noted among Point Hope residents from 1984 to 1989 (Chandler and Middaugh, 1992).

The State of Alaska Department of Health and Social Services released a report in November of 1992 titled "Health Risk Assessment of Radioisotopes at Cape Thompson, Alaska." This report completely rebukes any notion of potential hazard of visiting, let alone living near, the Project Chariot site at Cape Thompson. Among the concerns the report addresses is that the radioactive material may enter the food chain of Native Subsistence hunters and their families through uptake by plants growing atop the burial mound which are in turn eaten by caribou grazing at the site. The report states that "... the material is located well below the roots of the surface plants, precluding its introduction into the food chain." Other issues presumably put to rest by this report, include the assumption that the material buried in the mound is still radioactive. "Of the 24.3 millicurie of material buried in 1962, there remains a maximum of 11.3 millicurie of radioisotopes in 1992, assuming that the Sedan Fallout material has an extremely long half-life, and none of the material has undergone disintegration. Assuming that the Sedan Fallout disintegrates with a half-life of 30 years, only seven millicurie would remain at present." (Chandler and Middaugh, 1992).

The report gives a lot of weight to the "very effective shielding" provided by the soil, "... demonstrated by the fact that there was no increase in radiation readings above background levels directly atop the disposal site in 1962, and as expected, none was detected in 1992."

The report also gives "worst cases scenarios, such as "... if an individual were to have remained atop the burial site 24 hours per day for a full year, the most radiation he could receive from the site over and above background would be 10⁻⁵ milliRoentgen. This radiation is equivalent to about one millionth of a routine chest x-ray or to the exposure a person receives in nine hundredths of a second in a jet plane at cruising altitude." Also, "one would have to live at the site for approximately 500 years to reach the minimum exposure level associated with possible increased risk of cancer."

But what if the radioactive material were eaten? "...in order to exceed maximum permissible quarterly ingestion limits for Cesium, one would have to consume over 16 cubic feet of the disposal material every three months. One would become sick from eating din long before ingesting enough Cesium to experience any shon-term or long-term radiation-related health problems."

The known amounts of radionuclides from the Sedan Fallout have only recently been de-classified. The information released is consistent with the findings presented by the Alaska Department of Health and Social Services.

On February 10, 1993, the headlines of the Anchorage Daily News read "Feds tap \$3 million to clean up nuke site." Tom Gerusky, Department of Energy spokesman said that even though the DOE is "99 percent sure" that it poses no risk to people, "it's that 1 percent that we can't be sure of." The cleanup plan calls for 25 workers to dig up the contaminated area and pack it in barrels. The barrels will be barged to a hazardous waste dump in Hanford, Washington. The cleanup work is expected to begin in July and be finished in September.

The mayor of Point Hope, Jessie Kaleak, quoted in *We Alaskans* believes this action is the very least the government can do. The plan, he says, "doesn't address health issues and the monitoring of our oceans and land and marine mammals. That is something we pushed for and we are not going to give up on it." (Magdanz, 1992)

The nuclear legacy of Cape Thompson is still being written.

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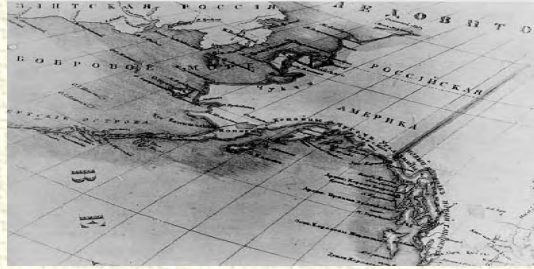
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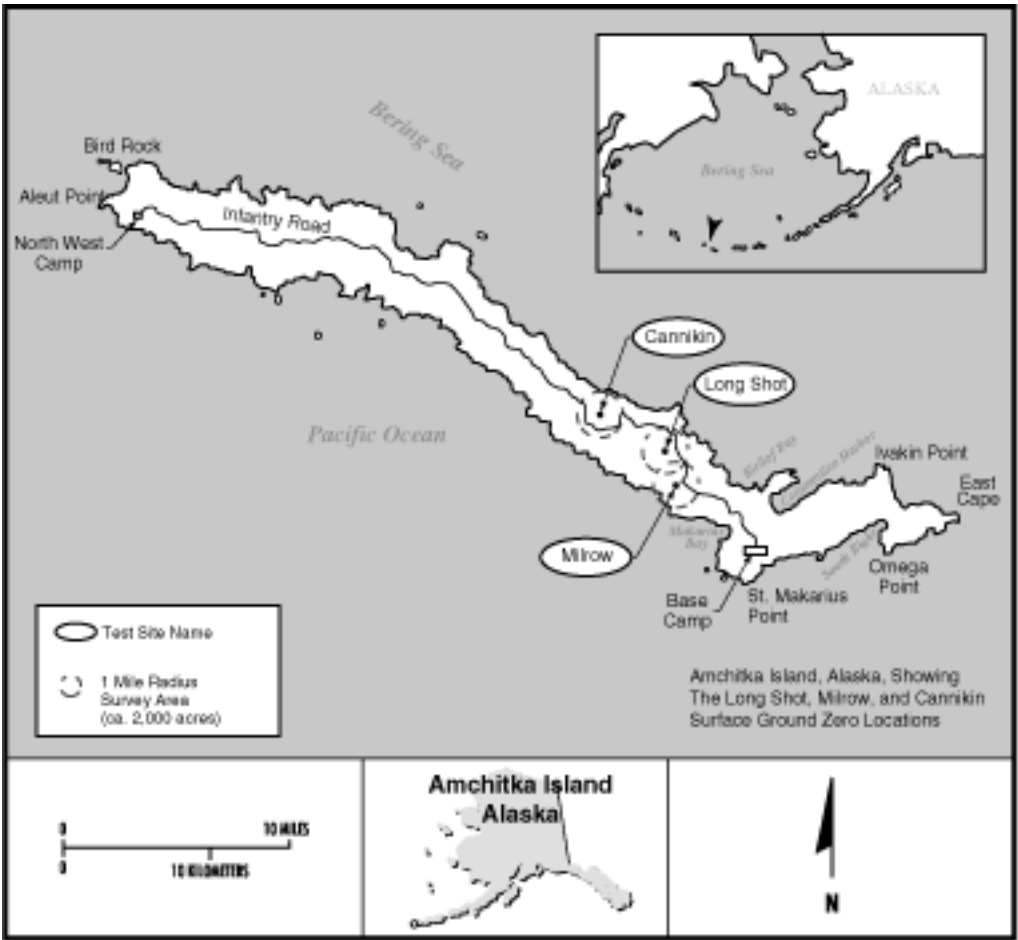


Maps

[Amchitka Island \[site of Cannikin Nuclear Test\]](#)

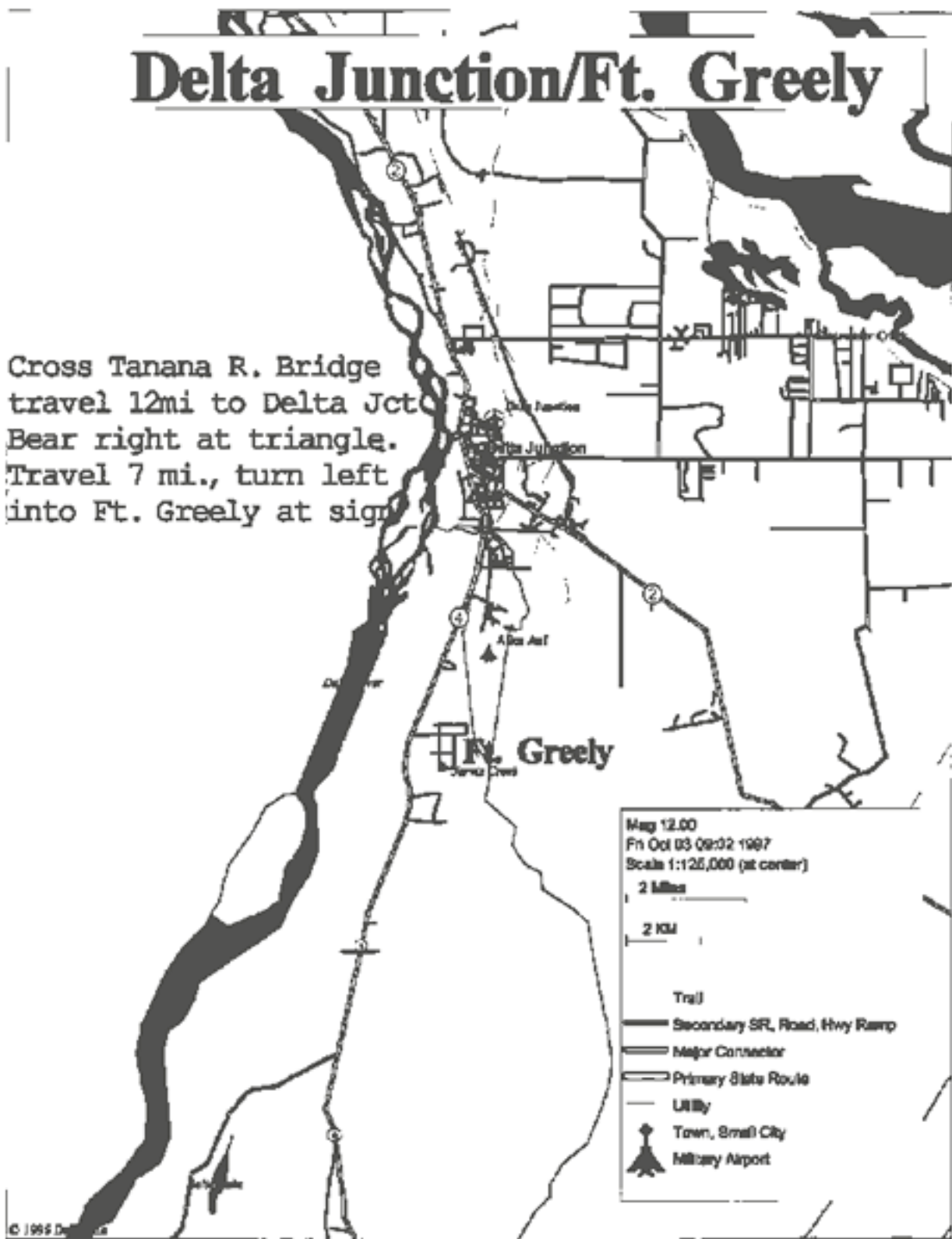
[Delta Junction/Fort Greely](#)

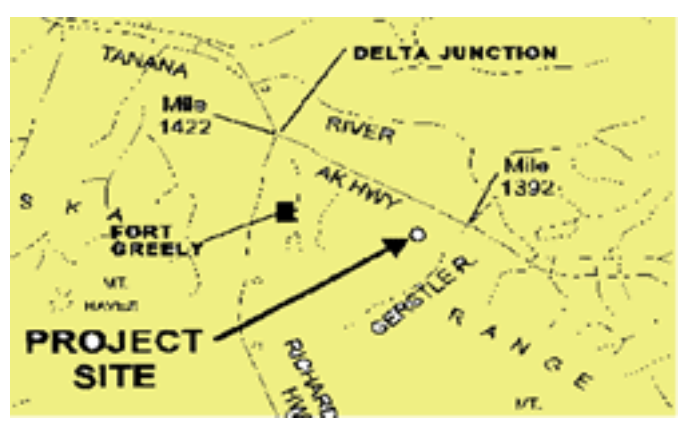
[Gerstle River Project site](#)



Delta Junction/Ft. Greely

Cross Tanana R. Bridge
travel 12mi to Delta Jct
Bear right at triangle.
Travel 7 mi., turn left
into Ft. Greely at sign





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