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Simple Shelters?

Monitoring Radioactive Fallout Across Canada, 1959-63

Andrew Burtch

During the early Cold War, the threat of nuclear war drove many governments around the world to urge their citizens to build fallout shelters in which they could wait out the deadliest period following an attack. A thermonuclear bomb, detonating at ground level, would scatter intensely radioactive particles hundreds of kilometres downwind of the explosion. Numerous explosions would blanket southern Canada with fallout, which would kill millions of citizens. Herman Kahn, the RAND Corporation analyst whose outspoken views formed the genesis of Stanley Kubrick's doomsday movie *Dr. Strangelove*, drily commented in his 1960 dissection of thermonuclear war that "the radiation from fallout has curious and frightening effects."¹ Ultimately, a high dose of radiation, as observed by doctors and military officials following the attacks on

Abstract: During the early Cold War, the Canadian government advised the public that they could cheaply build fallout shelters in their homes to protect their families from radiation after a nuclear war. Publicly, the government stayed out of the shelter-building business, citing that the cost was too high. However, from 1959 to the mid-1960s, the Canadian Army secretly constructed a network of 2,000 fallout shelters in government buildings: the Nuclear Detonation and Fallout Reporting System. This article explores the origins of this network and the reasons for its decline.

Hiroshima and Nagasaki and postwar nuclear tests, leads to a prolonged breakdown of the body, characterized by nausea, bleeding gums, internal haemorrhaging, hair loss, painful radiation burns, fever, delirium, and death.² In the postwar period, civilian and military planners hoped that the population would be able to limit their exposure to the most lethal doses of radioactivity after an attack by taking shelter underground. With fallout shelters, citizens could possibly survive an attack, even if they emerged to a destroyed world, where increased risks of cancer, birth defects, and widespread illness would be the norm.³

Some governments, most notably Sweden, invested large amounts of money to dig massive communal shelters to house tens of thousands of citizens, and forced the housing industry to include shelters in every new building. The Canadian government took a much less interventionist route. In the late 1950s and early 1960s, Prime Minister John Diefenbaker, provincial premiers, and local officials unsuccessfully advised homeowners to build shelters at their own expense. The Emergency Measures Organization widely distributed blueprints for a shelter that homeowners could construct for a cost of \$500 (approximately \$4,000 today). The accompanying designs were meant to create the impression

that safety was both simple and reasonably affordable. The price, nearly 10 percent of the average Canadian income, was beyond the means of most Canadians, however. The federal government, for its part, firmly stood by a position that it could not afford to get into the business of building fallout shelters for millions of Canadians.

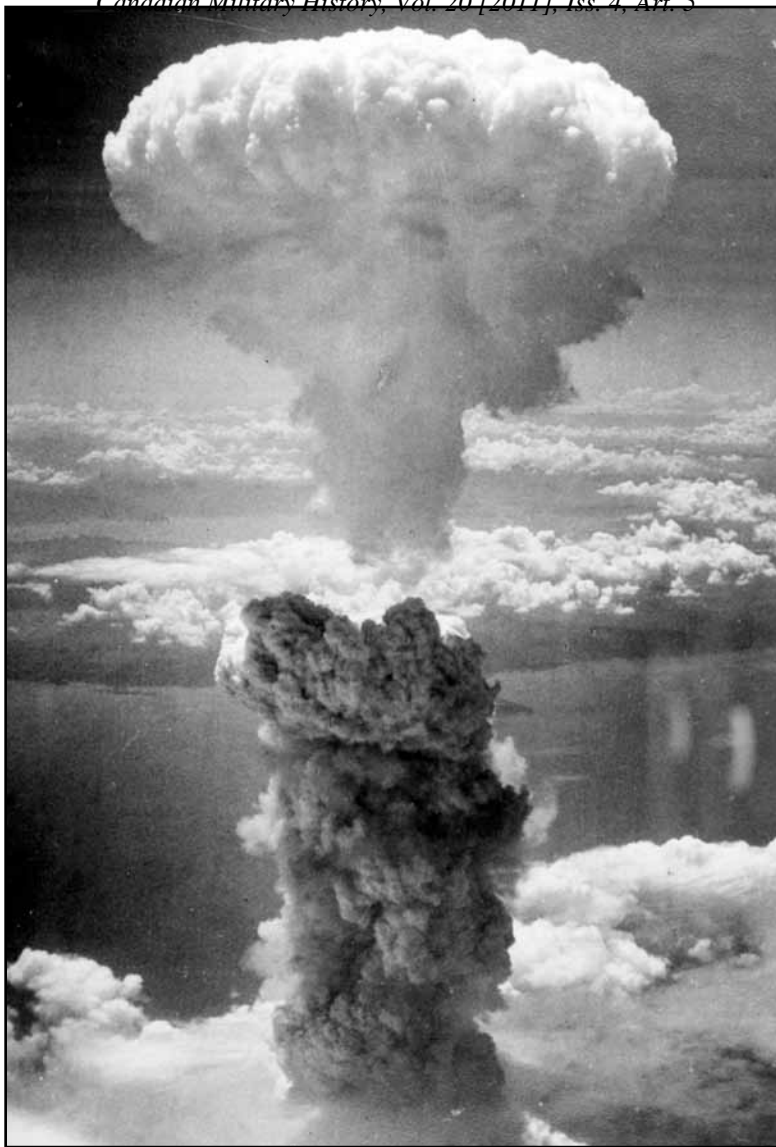
Yet at the same time, the federal government became the largest builder of fallout shelters in the country, investing millions of dollars in a secret crash program between 1959 and 1963. Some aspects of this project were controversial, such as the blast shelter in Carp, Ontario, meant to house military and government officials. A Toronto reporter who

Résumé : Au début de la guerre froide, le gouvernement canadien a informé la population qu'elle pouvait construire à faible coût des abris antinucléaires dans leur maison afin de protéger leur famille d'éventuelles retombées nucléaires après une guerre nucléaire. Publiquement, le gouvernement s'est tenu à l'écart de la construction de ces abris en affirmant que le coût aurait été trop élevé pour lui. Cependant, de 1959 au milieu des années 1960, l'Armée canadienne a secrètement construit un réseau de 2 000 abris antinucléaires dans des immeubles gouvernementaux : le Nuclear Detonation and Fallout Reporting System (système de déclaration de détonation nucléaire et d'abris). Cet article explore les origines de ce réseau et les raisons de son déclin.

discovered the bunker during its construction gave it the nickname "Diefenbunker." Much to the embarrassment of the prime minister, the nickname stuck.⁴ Shelters like the Diefenbunker and similar provincial sites were intended to provide for continuity of government authority during a national crisis, but drew much public criticism as evidence of a government's willingness to pursue self-preservation rather than national survival. One Vancouver couple expressed their anger about government shelters in a scathing letter to Diefenbaker in response to a televised civil defence exercise in the spring of 1961: "We sincerely hope that neither you nor any Civil Servants with access to Government shelters will be found dead, trampled in the rush to the entrance to the shelters, when

those who got there first emerge in two weeks to mourn and bury the rest of us."⁵

Less well-known than the Diefenbunker, but essential to the government's post-attack planning, was the Nuclear Detonation and Fallout Reporting System (NDFRS). This network comprised more than 2,000 fallout shelters modelled on the blueprints distributed to Canadian families, and installed secretly in government buildings across the country. The Canadian Army hoped to have the network in place quickly. The military was, however,



The nuclear attacks on Hiroshima and Nagasaki (above) ushered in a new era in civil defence. The destructive potential of atomic weapons forced the Canadian government to address the issue of protecting its citizens in a manner that had previously never been considered.

unprepared for the complexity and difficulty of a project as seemingly simple as installing cinder-block shelters in basements. The project took three years, at a cost of over \$3 million, but even so the final results were significantly less substantial than the military had originally hoped to achieve. The NDFRS provides an interesting case study of the challenges of emergency planning in peacetime and the politics of shelter-building in Canada. Remnants of the NDFRS are present in hundreds of communities across southern Canada, a material record, in mortar

and cinderblock, of the desperation of efforts to survive the Cold War.

The Canadian military first entered the shelter-building business as a result of two factors: the rapid progress of the Cold War arms race, and the inability of federal, provincial, and local civilian defence agencies to keep pace with the changing threat to Canada. Thermonuclear or hydrogen bombs, developed by the superpowers in the early 1950s, nullified the plans of civil defence agencies tasked with defending life and infrastructure. Planners in Canada, the United States, and the United Kingdom previously developed strategies that incorporated fire-fighting and rescue principles tested during Second World War bombing raids.

Atomic weapons were powerful enough to destroy parts of cities, but thermonuclear weapons threatened to wipe out entire cities in a flash. The only solution civil defence planners suggested was not to be there when the bomb went off.⁶ By 1954, Canadian officials began to plan for the evacuation of major target cities within three hours of receiving an attack warning. These arrangements included arrangements to control traffic movement, allay public panic, billet and care for evacuees, but tended to ignore the lethal effects of radioactive fallout. Without shelter, evacuees would

survive the bomb but die from radiation illness in the countryside.

The mushroom cloud resulting from a thermonuclear explosion would spread irradiated ash and dust in the upper atmosphere, poisoning the environment for hundreds of kilometres downwind of the explosion. Even if, as some planners believed, the country escaped direct attack, nuclear detonations in the United States would still threaten national survival. The Canadian military recognized the risks posed by thermonuclear weapons by 1954, but Canadian civilian defence agencies, chronically underfunded and divided among three levels of government, fumbled for years to find an effective solution before settling on the family fallout shelter as the best of the few options available that might save lives. The situation prompted a national review of civil defence planning by retired chief of the general staff Lieutenant-General Howard Graham, who recommended in late 1958 that the armed forces should assume primary responsibility for coordinating national survival efforts, supported by other government departments.

In May 1959, the federal cabinet passed a Privy Council order that incorporated many of Graham's recommendations. Among other challenging tasks, the Canadian Army was assigned the responsibility to create and maintain an attack warning system, detect nuclear explosions, and monitor levels of radioactive fallout over Canadian territory.⁷ These responsibilities eventually brought the military into the business of building fallout shelters across the country.

Large government blast shelters such as the Diefenbunker served two purposes – to house key government officials in order to ensure continuity of government through an attack, and to house a military communications network capable of keeping links

open to different parts of the country during the opening stages of a war. Provincial and municipal shelters were linked in to this network, as were key military facilities in Canada and the United States. The trouble with the system as it was originally devised was that, once in the shelters, government officials would be cut off from the outside world. Without reliable reports about local conditions, emergency measures officials would be unable to advise the public about when it was safe to emerge from their home fallout shelters and commence the arduous process of rebuilding. The Nuclear Detonation and Fallout Reporting System (NDFRS) was designed to serve as the eyes and ears of the country.

Efforts to create the NDFRS began in earnest in August 1959, shortly after the Cabinet Committee on Emergency Plans (CCEP) approved the army's plans for a National Survival Attack Warning System, the network of air raid sirens installed across the country. The Royal Canadian Air Force, the service that was originally responsible for radiation monitoring, developed the original plans for the system before the transfer of responsibility to the army.⁸ The army worked with a study group composed of representatives of the navy, air force, Defence Research Board, and other government agencies to develop recommendations for Cabinet. This group looked at what the United Kingdom and the United States had done to create a radiation monitoring network. By early 1960, the British had settled on plans to develop a grid of 1,500 hardened fallout shelters equipped with Geiger counters and telephone lines that could report radiation levels to the Home Office. This system would be operated by volunteer staffs and members of the Ground Observer Corps, a volunteer organization that had been created to

report suspicious aircraft movements over the United Kingdom.⁹ In the United States, different military and government agencies at the federal, state, and local levels had some capability for radiation reporting. The Office of Civil Defence and Mobilization (OCDM) had, however, proposed the creation of a Fixed Federal Monitoring Network, where fully automated, remotely-monitored radiation sensors would be installed on approximately 6,000 federal government buildings to transmit data from which OCDM could determine fallout patterns.¹⁰

The Canadian study group, observing the technological and financial challenges posed by developing an automated system from scratch, looked to create something closer to the British model of shelters manned by volunteers. They proposed two types of fallout shelters. The first, nuclear detonation reporting posts, would be established around Canada's main target cities: Victoria, Vancouver, Calgary, Edmonton, Winnipeg, Windsor, London, Niagara Falls, Hamilton, Toronto, Ottawa, Montreal, Québec, Saint John, Halifax, and St. John's. Each city would be ringed with three or more fallout shelters equipped with specialized equipment to determine the location and height of blasts, and the approximate destructive power of each bomb detonated over Canadian territory.¹¹ This information would assist planners to determine the extent of immediate casualties and begin to predict fallout coverage. The second, far more numerous type of shelter, was the fallout reporting post.

A Defence Research Board study in 1956 had investigated the projected shape of fallout clouds that would form downwind after explosions in Canada and the United States. It determined approximately 2,000 posts would be required to effectively monitor radiation intensity on the

ground. The posts would need to be situated in a grid south of the 55th parallel, with posts 15 miles apart on the north-south axis and 45 miles apart from east to west. The RCAF had adopted these findings as the foundation for the national network in its early planning work in 1959.¹² The Canadian Army built on these assumptions when finalizing plans for the system.

To save money and speed completion of the network, the Army recommended to Cabinet that shelters could be installed in Department of National Defence facilities, Royal Canadian Mounted Police detachments, Department of Transport weather stations, provincial police stations and Lands and Forests departments, as well as in railway stations.¹³ A brief survey had revealed that using these sites alone could account for nearly three-quarters of the national grid, covering everything

from the urban core of target areas to the sparsely populated countryside.

The detonation and fallout reporting posts would communicate their findings to filter centres, fallout-protected regional facilities located in federal properties, which would verify post reports and forward them to the federal and provincial bunkers for analysis. In an emergency, the government would use the data to advise families about relative levels of safety across the country, prepare evacuation orders for areas facing lethal levels of fallout, and advise homeowners by radio broadcast about when the most lethal period following an attack ended. (See Figure 1.) The Army's study group

forwarded its recommendations to the CCEP, which gave approval in principle on 29 June 1960.¹⁴ Then began the slow and difficult task of actually building the system.

The work to move from the concept to actually breaking ground on shelters took nearly two years. Approval from the CCEP did not immediately bring funds from the Treasury Board to pay for construction and materials. More important, Cabinet approval did not guarantee participation by provincial or municipal government agencies,

completion, to have all nuclear detonation posts operational by 1 July and all fallout posts ready to report by 31 December 1961.¹⁵

Area commands reported back to Army Headquarters with their results that spring. Each command carried out map studies to determine suitable locations for fallout shelters throughout their areas, using existing federal buildings as much as possible. The process of mapping out where the shelters would go also resulted in greater scrutiny of the possible weaknesses of the system.

Major-General John Rockingham, commander of Quebec Command, noted that most of the proposed shelters would use existing civilian communications lines. Most of these ran through Montreal's main exchange. Montreal's destruction would therefore cripple fallout reporting and national survival efforts

in Quebec. Even if Montreal was spared the direct effects of attack, no provision had been made to provide fallout shelters for civilian switchboard operators, so communications would still be non-existent. Resolving this problem would require the introduction of military communications outlets in many proposed sites.

Rockingham also indicated that federal buildings could only house a fraction of the shelters required for effective reporting in the province. Provincial or private agencies, such as the national railways, forestry companies, or power generating firms, would need to be brought in to the project. Success depended

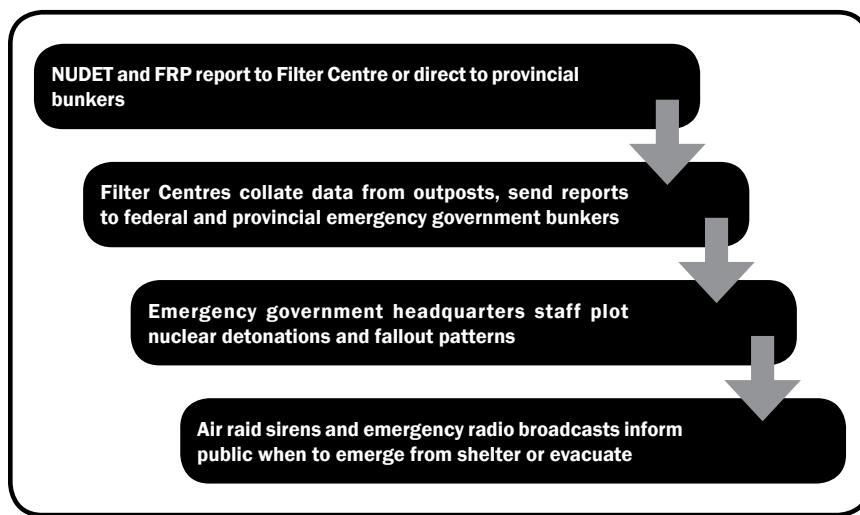


Figure 1: Nuclear Detonation and Fallout Reporting System (NDFRS) Communications

let alone outside partners like the national rail systems, whose support had to be solicited. Most ready to cooperate was the military. The newly-formed Directorate of Survival Operations and Plans presented the concept to the area commanders responsible for the Army's operations within Canada in the late summer of 1960. In January 1961, Lieutenant-General S.F. Clark, the chief of the general staff, directed each command to begin investigating possible shelter locations and to open discussions with provincial agencies and deliver an early report about proposed locations in their areas of jurisdiction. The directive contained what proved to be an optimistic schedule for

on these private firms' interest in committing their facilities and staff members to the NDFRS system. Work on nuclear detonation reporting posts appeared to have been simpler because the military could in most cases use its own installations near target cities.

Finally, Rockingham identified the system's largest flaw. What if the shelters were built, but nobody decided to volunteer to report from them during an emergency? Rockingham noted that "it is unrealistic to expect a man to operate in a fallout shelter for 14 days if his family is also not supplied with a shelter. Hence these [FRPs] should be large enough to accommodate the operator and his family."¹⁶

Obtaining assistance from external agencies would be key to meeting the system's schedule for completion. However, the military did not have authority to contact the Canadian National and Pacific Railways, or begin preparations for shelters at provincial sites until July 1961.¹⁷ The pace changed in August, as superpower confrontation over access to Berlin threatened imminent nuclear war. As the crisis reached its peak, the United States persuaded its allies to increase their general military preparedness and funding for civil defence.¹⁸ As US secretary of state Dean Rusk explained to nervous allies at the North Atlantic Council, the measures were not meant "to rattle the saber, we propose to show how quickly it can be drawn from the scabbard in defence of our obligations and rights."¹⁹ As the crisis deepened, the Canadian government scrambled to



**Major-General John Rockingham
painted in 1958 by Brenda Bury**

increase its military readiness and accelerated all of its national survival projects.

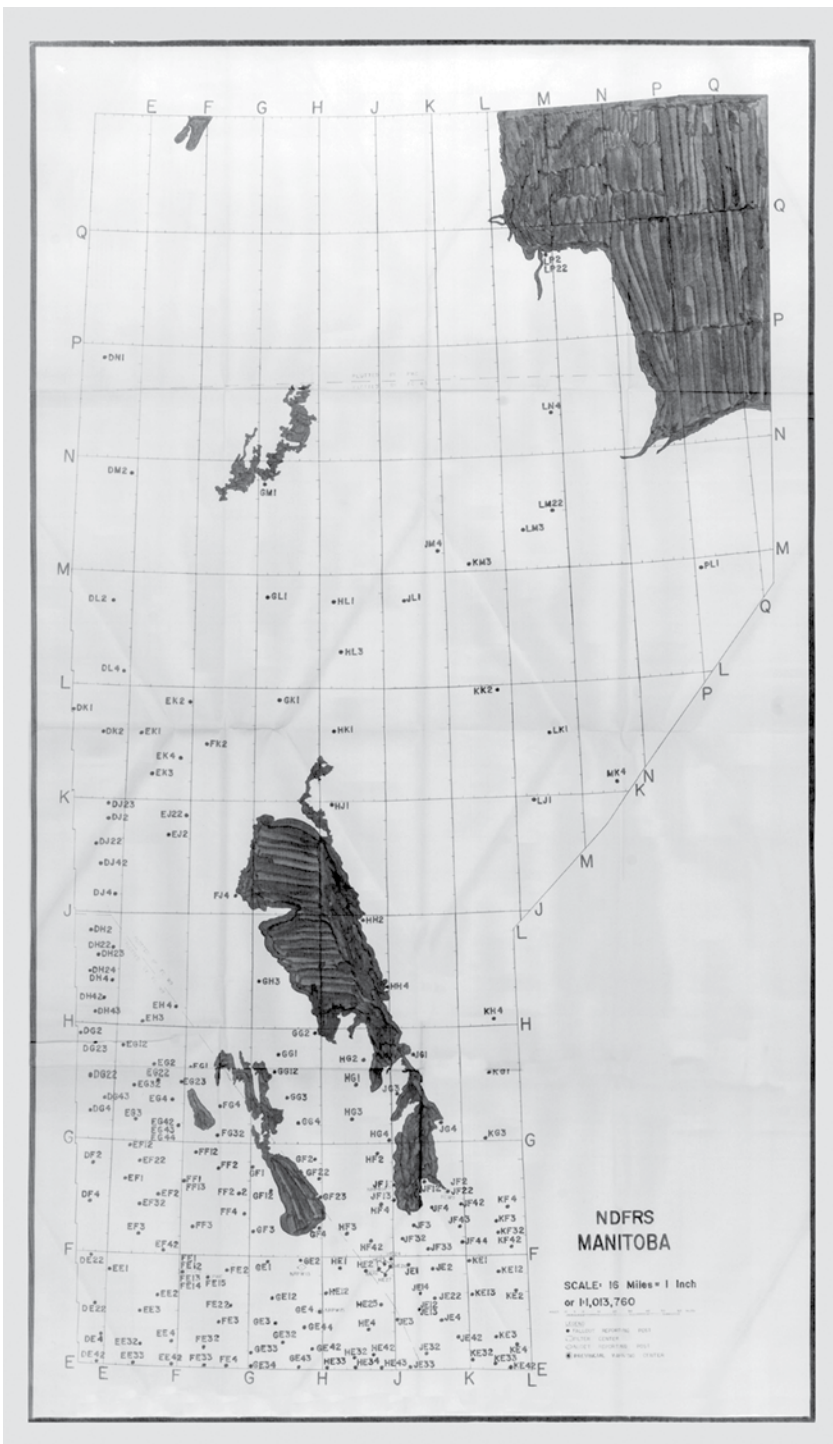
Diefenbaker's Cabinet met five times in late August to approve measures that would underscore Canada's moral and military support for the United States and Berlin. At these meetings, defence minister Douglas Harkness recommended the immediate dispersal of food rations, military vehicle stocks, and emergency clothing from central warehouses to depots outside Canadian target areas. A significant number of Harkness's recommendations dealt with the NDFRS system. Before the Cabinet meetings, General Clark had informed Harkness that the Army required immediate Treasury Board approval to start construction at

NDFRS sites, to purchase and install air raid sirens to expand the attack warning network, and needed nearly \$4 million worth of radiation detection equipment. Clark proposed to use existing stocks to supply FRPs with radiation detection equipment as soon as possible, so that the system could obtain "a limited capability in about two weeks." Of course, doing so meant stripping radiacmeters from the Militia and Regular units tasked with re-entering bombed cities to rescue civilians, until new equipment could be procured.²⁰ Taking Clark's advice to Cabinet, Harkness also requested greater autonomy for the Army's Area Commands so that they could award contracts, authorize overtime, and take other measures to ensure that the NDFRS shelters could be built quickly. The Cabinet uneasily agreed

to back the American position over Berlin, and acted on Harkness's suggestions and a range of other exceptional measures to accelerate military and civilian planning for nuclear war.²¹

Soon after the Cabinet meeting, Treasury Board officials gave advance approval of the military's expenditures to purchase equipment, and, more importantly, allowed the army headquarters to delegate authority for construction to the area commanders.²² As a result, general officers commanding received permission to spend as much as \$15,500 to build a Filter Centre, \$6,000 to build a nuclear reporting post (NUDET), and \$700 for each basic basement shelter built for use as a fallout reporting post (FRP),

Library and Archives Canada, RG 24 Vol 19438 File 2426-4-25/0



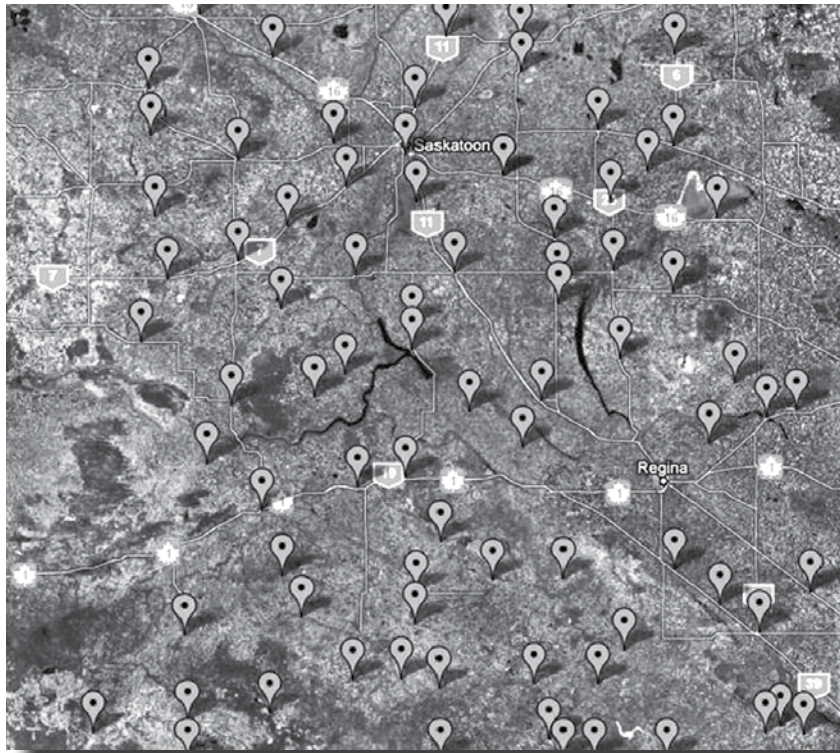
This map shows all the planned locations of fallout reporting posts in Manitoba. Each post was assigned a number based on its geographical reference location.

considerably more than the \$500 Canadian civilians were told would be sufficient to build a basement shelter.²³ Within these limits, the area commanders had significant freedom to use civilian contract labourers to build the shelters, install equipment, and purchase needed shelter stocks locally. The goal of this new “crash program” was to expand the system

the railways and the RCMP. These organizations had outposts in far-flung locations with access to national communications networks that, with some adjustment, could be linked in to the military signals system. In early September, Major-General Arthur Wrinch, DSO&P’s chief planner, met with the regional heads of Canadian National, Canadian Pacific, Ontario

be the case in fallout reporting.”²⁵ After consultation with the unions, the major rail networks agreed in October to begin building shelters in their stations under army supervision and at federal expense.²⁶

Cooperation with other government departments, including the RCMP, proved more difficult to arrange than the railway agreement.



A partial map of the fallout reporting posts completed as of 1963 near Regina, Saskatchewan. Map developed by author.

as quickly as possible, with the objective of completing the NDFRS by January 1962.²⁴

Armed with discretionary spending powers and additional staff, the Canadian Army reached out for cooperation from other national and provincial agencies. In August 1961, the Directorate of Survival Operations and Planning (DSO&P) contacted key government and private sector partners to brief them on the NDFRS project and obtain their assistance. Two groups were crucial to the success of the building program:

Northland Railway, and Quebec North Shore and Labrador Railway to gain their cooperation. The rail executives were concerned about having to pay “overtime” costs associated with manning shelters in their stations during a nuclear war, but were otherwise supportive. They noted that unionized staff members would probably sign on to staff the fallout shelters because “the unions had previously cooperated in aircraft spotting, and took it on with enthusiasm in spite of the fact that it involved rather more effort than will

As his colleagues reached out to the railways, Lieutenant-Colonel Edward Churchill, the engineering officer who masterminded construction of the Diefenbunker and other major projects, worked with federal and provincial partners to develop a clear division of responsibility for building and maintaining the shelters. The army would specify which buildings required shelters, and what type to build, and would work with local agencies to find contractors to build the shelters. After construction was complete, the local agency would



Militia recruits practice rescue skills during a course at the Lakeview Armoury in September 1961.

look after the shelter's maintenance and would be responsible for staffing the shelter in wartime. Churchill suggested that reluctant employees could be persuaded to volunteer as radiation monitors because they would be able to bring their families into the fallout shelter, and "the advantages provided to the individual and his family when he

undertakes this responsibility far outweigh any inconveniences."²⁷

Soon after Churchill laid out his plans, work to complete the NDFRS quickly began to founder on the rocks of intergovernmental and departmental disputes. Central Command staff officers reported to headquarters in late October that, while the Ontario provincial

government had agreed to cooperate with the NDFRS building program, it had not passed on information to its responsible departments. The Army would have to negotiate with each department separately to access their buildings and make arrangements for local construction, with resulting months of delay.²⁸ The situation was not much better in Quebec Command.

In Rockingham's headquarters, the command engineer complained to Ottawa that the January deadline could not be met:

These [local arrangements] involve so many agencies and the associated communication problems are so complex that considerable negotiating and discussion must take place before construction can begin. These, together with the inherent delays imposed by winter construction and the inevitable loss of time during the Christmas period, are bound to slow down the programme.²⁹

Even where federal agencies such as the RCMP had agreed to cooperate fully with the Army and build fallout shelters in its detachment houses, getting the cooperation of the detachments themselves proved difficult. In some cases, shelters could not be constructed at all. In Western Command, most of the RCMP detachments in Alberta operated from leased private homes. Their standing orders were to undertake only short-term rental arrangements. The Army would therefore need to reach agreement with the property owners and obtain reasonable assurances that the shelter could be staffed in wartime.³⁰

Not all obstacles to construction were so reasonable. Major A.J. Arcand, the officer commanding 12 Works Company, RCE, reported to Western Command that he had run into substantial opposition from F Division RCMP detachments. The local Mounties objected to shelter construction in their detachments, Arcand explained, "in most buildings this area is already used or it is intended to use it for workshop area, storage, exhibit room, clothes-drying lines or recreation area. The RCMP are not prepared to give up these facilities to provide space for a shelter."³¹ Despite orders from RCMP



Courtesy of Metabolic Photography

The fallout reporting post built beneath a post office in Leduc, Alberta was disassembled to make room for this work room.

headquarters that "real interference must be apparent before denying the use of space," the army engineers encountered resistance from local detachments where construction would temporarily disrupt work or otherwise inconvenience employees.³²

The problems with getting the NDFRS underway were not entirely the result of disagreements with local agencies. In most cases, construction stalled because of faulty assumptions made in area headquarters during the initial planning for NDFRS sites in the spring of 1961. At that time, area commands did their planning from a map reconnaissance, armed with lists of DND, government, and railway properties, to create their rough 45 x 15 mile grid of fallout reporting posts. Once the funds for construction began to flow from Treasury Board, area command engineers directed personnel to conduct hundreds of site visits, and negotiate with local staff. These military engineers assessed the facilities identified in the map reconnaissance, sent back sketch plans to help HQ produce blueprints and manufacturing specifications, and identified lists of local contractors

who could build the shelter at each site.³³ Approximately 2,000 sites had to be assessed across the country, a large burden on the area command staff personnel. Despite substantial efforts by engineering staffs to complete their site surveys quickly, they were too few to visit every site. In Ontario, arranging visits to some locations proved very difficult, especially in northern parts of the province. As Major-General H.A. Sparling, GOC Central Command, explained to the quartermaster-general: "It has not been physically possible to date to complete the preliminary staff reconnaissance. To this date, approximately 75% of these have been carried out. The main problem has been in the northern areas...where many of the recess have been carried out by air and in the case of the railways by handcar." Sparling accurately predicted that less than half of the FRPs in his area could be completed by the January 1962 deadline.³⁴

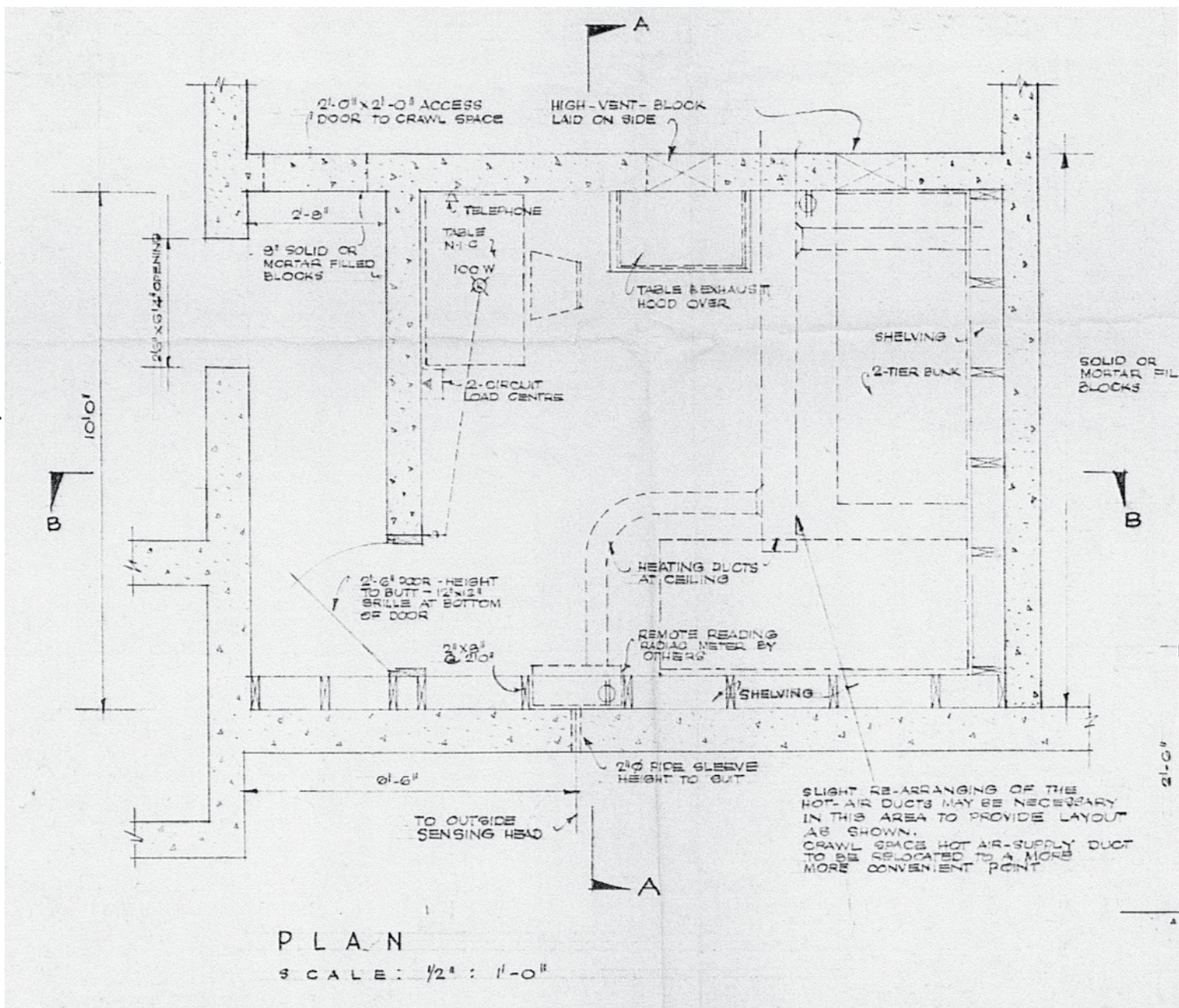
In some cases, once engineers arrived on-site, their assessment revealed that many building basements were unsuitable to house

shelters, either due to lack of space or poor building condition. As a result, new sites would have to be selected, or the building would require an above-ground shelter at additional cost. In Nova Scotia and New Brunswick, many of the railway stations required shelters located outside the facility. Above-ground shelters could not be built cheaply in winter. In Newfoundland, reconnaissance parties had to be flown

into some sites by helicopter. Labour and materials would also need to be airlifted to these sites, where winter construction was impossible, leading Eastern Command to cancel or defer construction of 68 FRPs in their region.³⁵ In western Ontario, a number of sites had to be abandoned after the reconnaissance group reported that no communications links existed in the building, requiring a new survey of the area and additional site visits.³⁶

Where shelters could be built, the costs varied widely depending on the state of the building and cost of local labour. Some basement shelters could be built for less than \$100-200, as was the case for a shelter at one of the Toronto Area Target Headquarters in Newmarket, Ontario, but others could be ten times as much. When Ontario Provincial Police refused to build a shelter outside their district headquarters in Perth, Ontario,

This blueprint shows the design of a standard fallout shelter for use in RCMP detachments.



Library and Archives Canada, RG 24 Vol. 19436 File 2426-4-2

labourers had to excavate a new basement area underneath a vehicle garage, at a cost of \$2,200.³⁷ Most shelters, however, appeared to have been built for slightly more than the authorized \$700 limit. Each of these required additional approval from Army headquarters, leading to yet longer delays. When Rockingham requested blanket permission to authorize the construction of more expensive shelters in order to avoid wasting time on seeking case by case approval from Ottawa, he was curtly (if accurately) told that "small increases in price will substantially increase total costs."³⁸

The cost of above-ground fallout shelters was much higher than the average basement construction. Above-ground shelters required additional fallout protection. One design prepared by the Army Works Service (AWS) estimated that a 60 square foot shelter designed to house two people would need to be surrounded by at least 21 inches of crushed stone to adequately shield the occupants from radiation. The cost of this design was approximately \$2,900 (nearly \$23,000 today).³⁹ In Jasper National Park, where shelters were planned in the wilderness, the cost per shelter sky-rocketed. Engineers estimated they would need \$14,000 to build three shelters in the woods.⁴⁰ The army solicited bids from private companies such as the Butler Manufacturing Company for pre-fabricated shelters that could be flown in to remote locations, hoping for some savings, but the costs were roughly equivalent to those designed by the AWS.

By the time many of these problems became apparent, the January 1962 deadline had passed. Nevertheless, the NDFRS system slowly began to take shape. By mid-1962, shelters had been installed at many of the surveyed sites, and plans were in place to continue with additional installations each

fiscal year. Fortunately, it appeared that the Canadian government and the armed forces could afford to proceed at a more leisurely pace. The German Democratic Republic (GDR) did much to resolve the Berlin crisis in late August 1961 by building a wall between East and West Berlin. Though American and Soviet tanks had a tense standoff at one of the crossing points into East Berlin, and the West decried the GDR's repressive move, world leaders privately breathed a sigh of relief. By late 1961, Berlin was no longer a flashpoint for conflict.

The Canadian Army procured thousands of IM-108/PD radiacmeters like this one for National Survival issue. Many were installed in fallout reporting posts.

The Canadian government did not completely let down its guard, however, as work proceeded on the NDFRS and other, higher-profile national survival programs such as the Special Militia Training Plan, an effort to temporarily recruit 100,000 Canadians into the Militia for a six-week course in rescue and other civil defence skills.⁴¹ A crisis of a different type did much to derail hopes to complete the NDFRS program in 1962.

Since assuming power in 1957, John Diefenbaker's government endured a significant downturn in the Canadian economy. The postwar boom slowed in the late 1950s, and by 1961 more than 350,000 Canadians were unemployed, approximately 7.5 per cent of the work force. The expanding ranks of unemployed steadily drained the government's limited unemployment insurance coffers.⁴² Canada also suffered a significant trade deficit with the United States, importing a billion dollars' worth of goods more than it exported. Confidence in the economy

fell, and, following a rancorous public dispute with the governor of the Bank of Canada, Diefenbaker devalued the Canadian dollar, and implemented austerity measures to control deficit spending.⁴³ The Cabinet directed the Department of National Defence to make cuts in June 1962. Of the \$82 million cut from the defence budget, the army's share totalled \$29 million. The NDFRS accordingly fell under the axe along with



other national survival programs, including work on the national warning system and the military communications system meant to connect all the government bunkers in wartime. A departmental spending review deferred funds to construct the 812 remaining FRPs, NUDET stations, and filter centres until another fiscal year.⁴⁴

Major-General Wrinch in DSO&P responded with some incredulity, noting that the cuts rendered the warning and reporting systems non-effective, leaving the military unable to live up to its responsibilities. Halting construction on the NDFRS, he warned, "could lead to a major increase in loss of life in the event of an attack."⁴⁵ The budget cuts effectively crippled the NDFRS. Despite intergovernmental confusion and slow progress on construction, approximately 1,200 FRPs had been built or were near completion at the time of the departmental review. In

order to become operational, however, these reporting posts needed secure communications links and equipment that could effectively gauge radiation levels, or, in the case of nuclear detonation posts, the direction and intensity of nuclear explosions over Canada. An immediate impact of the departmental review was the loss of funds to establish communications links from the shelters to filter centres and emergency government bunkers. Announcing the austerity measures, Harkness indicated that "rentals of telephone and teleprinter circuits, usually a heavy expenditure, will be restricted."⁴⁶ If an attack came, the government's ability to map and predict fallout patterns would be almost entirely dependent on existing communications links: railway telegraph, commercial telephone, or police radio circuits. As Rockingham had pointed out in his original assessment of the NDFRS, because these communications were routed through exchanges located in major target areas, it was very likely that the entire reporting system could be shut down in the first stages of an attack on North America.

Discussing the effects of the cuts, Harkness also mentioned to the press that "procurement of some items would be postponed."⁴⁷ This referred to the radiation and blast detection material that the FRPs and NUDET posts required to monitor radiation levels. The original design requirements of the FRP called for the installation of the IM-5015/TD, a radiacmeter that could be safely monitored from within the shelter, linked to a probe attached outdoors. By the time of the 1961 crisis over Berlin and the crash program, the Canadian Army had few of these meters. Instead, they distributed stocks of the hand-held IM-108/TD radiacmeters as "interim meters" until sufficient 5015s could be purchased to equip the far-flung reporting outposts.⁴⁸

While the official scales of issue for each FRP and NUDET post called for one 5015 set, the records indicate that the hand-held radiacmeters were the best that volunteer operators ever received.⁴⁹ One of the key attractions of the NDFRS was that volunteers could share the shelter with their families, offering some promise of safety in a post-attack environment. Without the remote-reading meter, the risks of contaminating the shelter and killing the occupants increased exponentially. Every time the occupant took a reading, he or she would have to turn on the meter, zero it, don protective equipment, and then venture outside the shelter to gauge radiation levels. The army's revised instructions for fallout reporting using hand-held equipment did not inspire confidence: "One minute, even 30 seconds, is a relatively long time, the exposure should be reduced to a minimum by rehearsing action before going outside..."⁵⁰ Considering that FRPs were required to report each hour, each outing meant increased risks of radiation sickness, more water lost to decontaminating equipment and clothing, and greater risks of contaminating the shelter itself. The 5015 sets eventually came into the Canadian Army's inventory, but records indicate that none were installed in shelters by the end of 1962.⁵¹

By the time of the Cuban Missile Crisis in the fall of 1962, the Canadian Army had built more than half of the facilities required for the NDFRS, but these basic shelters lacked essential equipment or reliable communications. Had a war occurred, it is very likely that the shelters might have saved some lives, but their greater value to the government of Canada as a tool to advise Canadian citizens about fallout patterns would have been severely limited. Fortunately for all involved, the Cuban crisis passed

without significant incident, and the shelters were not manned at any point during the standoff in the Caribbean. In the denouement of the crisis, work continued on the NDFRS at a slower pace, even though army officials close to the program privately argued that the urgency to complete the program was "greater, not less, than it was the last summer."⁵²

By 1963, the Canadian government and, by extension, the armed forces, had begun to move away from civil defence and national survival preparations. The government shifted responsibility for emergency measures to the Department of Defence Production, preferring to focus on plans for natural disasters rather than nuclear war. The Army, meanwhile, happily if quietly divested itself of many of its domestic responsibilities in favour of conventional war preparations overseas. The military retained control of the warning sirens, the Diefenbunker, and other provincial and regional emergency government headquarters. The NDFRS did not appear to survive this reorganization. The federal government transferred control of some shelters to provincial emergency measures agencies, to the railways, or to local authorities who wanted them.⁵³ In 1967, Canadian Army personnel toured command districts to retrieve communications and radiac equipment from the unused shelters, effectively dismantling the fallout reporting posts.⁵⁴

From 1959 to 1963, the Canadian Army engaged in a national project to build fallout shelters designed to collect and transmit information on the fallout that would blanket the country following a nuclear attack. The shelter-building experience highlights a central problem that plagued both civilian and military efforts to improve the country's passive defences against nuclear war. Interagency and interdepartmental

bureaucratic confusion slowed the implementation of policy, even in an emergency situation, while fiscal support to the project proved fleeting. Like the public, the military was forced to make its preparations with an imperfect and ultimately incomplete warning system. The military's frustrated efforts to construct a mere 2,000 shelters goes some distance to prove that building shelters was not as easy as had been advertised to the public in government pamphlets such as *Your Basement Fallout Shelter*. Working from nearly identical designs, the military found that costs often exceeded their own generous estimates, which were higher than the \$500 Canadians were told such structures would cost. More importantly, army engineers discovered that building basement shelters in rural municipalities proved more difficult than they had expected. Their discovery highlights some of the flaws in the fallout strategy as a whole, for it was in the countryside that the population was told to seek shelter. Most interesting of all is the fact that the army's shelter output during the period in question was virtually equal to the reported 2,000 family fallout shelters built by the public during these years. Ultimately, the NDFRS was an ambitious but deeply flawed aspect of the Canadian Army's national survival program. It was carried out for no other reason than, like much of Canada's preparations for nuclear war, an imperfect plan was better than nothing. Most of the NDFRS is gone. As railway stations closed, as RCMP and provincial police detachments moved from leased private housing to purpose-built facilities, the shelters were left behind. Without maintenance, some flooded. More often, the shelters were destroyed to make room for new construction, or filled in and buried to save costs. In Meath Park, Saskatchewan, the FRP was buried

when the CPR station was relocated and the building renovated to become a diner. An extensive survey would be required to determine how many of the FRPs and other facilities still survive. The author has uncovered several shelters scattered through rural areas, in some cases where the original building was preserved as a historic site.⁵⁵ What little remains of the NDFRS today, however, is physical evidence of the extent of nuclear war planning and how it touched many communities across Canada.

Notes

1. Herman Kahn, *On Thermonuclear War* (Princeton: Princeton University Press, 1960), p.85.
2. Samuel Glasstone, ed., *The Effects of Nuclear Weapons* (Washington: United States Government Printing Office, 1964), pp.592-625.
3. Kahn recorded one reaction to the post-attack environment he described in his public lectures: "a lady in the audience got up and said in a very accusing voice, 'I don't want to live in your world in which 1 per cent of the children are born defective.' My answer was rather brutal, I fear. 'It is not *my* world,' I observed, and then pointed out ... she had a real problem, since 4 per cent of the children are born defective *now*." Kahn, p.46.
4. "This is the Diefenbunker!" *Toronto Telegram*, 11 September 1961.
5. S. and M. Leskard to Prime Minister J. Diefenbaker, 5 May 1961, John Diefenbaker Fonds, Library and Archives Canada [LAC] MG 26 M, vol.48, file 140.
6. FCDA director's comments.
7. Major-General A.E. Wrinch, "Nuclear Detonation and Fallout Reporting System," *Canadian Army Journal* 15, no.3 (Summer 1961), pp.11-12, 21.
8. At the 11th Tripartite Conference on Toxological Warfare in 1956, the United States Air Force informed Canadian and British representatives of their intent to create a fallout monitoring network, and asked its allies to establish comparable monitoring systems. Bilateral meetings at the Military Cooperation Committee in December 1956 led to draft recommendations to the Canadian Chiefs of Staff Committee, which delegated responsibility for developing the system to the RCAF in February 1957. By 1959, the RCAF had held a number of interservice and interdepartmental meetings to establish a strategy and division of

responsibilities for the NDFRS, but apart from hiring on additional officers to train Ground Observer Corps volunteers in radiation plotting little material progress was attained. See LAC RG 24, Accession 83-84/167, Box 343, File 1616-7 pt 1. See also Army Historical Report No.96, "The Canadian Army's Role in National Survival Operations," 29 October 1962, p.44 See <<http://www.cmp-cpm.forces.gc.ca/dhh-dhp/his/rep-rap/doc/ahqr-rqga/AHQ%2096.pdf>> (Viewed 27 July 2011).

9. "Detailed Study on Proposed National Survival Nuclear Detonation and Fallout Reporting System, 16 March 1960," Directorate of History and Heritage [DHH] 112.3S2 (D57). Canada and the United States also maintained Ground Observer Corps detachments throughout the 1950s and early 1960s. See Kenton Clymer, "U.S. Homeland Defense in the 1950s: The Origins of the Ground Observer Corps," *The Journal of Military History* 75, no.3 (July 2011), pp.835-59.
10. Ibid.
11. The instrumentation for recording accurate information about the altitude, direction, and yield of nuclear blasts was developed by the Defence Research Chemical Laboratory at Shirley's Bay outside Ottawa. Nicknamed "the Educated Stovepipe," the instrument was a simple block of photosensitive polystyrene foam sheathed in a perforated metal cover, mounted on the roof of the NUDET shelter on a 2-inch pipe. If the monitored city was attacked, the holes in the instrument cover would admit the intense light from the blast. The height, yield, and direction of the blast could be discerned from the hole the light burned into the polystyrene. A brief description of the equipment can be found in "DSO&P - Brief for US Section MCC," 4 May 1962, LAC RG 24, vol. 19438, file 2426-4-25/10 pt 2.
12. Appendix 8 to HQS 2426-4, 16 March 1960; Appendix 2, DHH 112.3S2 (D57).
13. Detailed Study on Proposed National Survival Nuclear Detonation and Fallout Reporting System, 16 March 1960" DHH 112.3S2 (D57).
14. HQ 2426-4 TD0041A, 25 July 1960, DHH 112.3S2 (D47).
15. Annex A to HG 2426-4 (DSO&P 4), 17 January 1961, DHH 112.3S2 pt. 2.
16. Rockingham to Army Headquarters, QC 2426-1, 30 March 1961, LAC RG 24, vol. 19436, file 2426-4-22/0 pt 1.
17. R.A. Emerson to D.B. Armstrong, 1 August 1961, LAC RG 24 Acc 2000-01321-X, box 83, file 5341-31/7.
18. Cabinet Conclusions, 17 August 1961, LAC RG 2 Series A-5-a, vol. 6177.
19. NATO to External, 8 August 1961, DHH 114.3Q1 (D14).
20. Clark to Harkness, 15 August 1961, LAC RG 24 Acc 2000-01321-X, box 67, file 5115-91/548 pt 1.
21. Cabinet Conclusions, 17 August 1961, LAC RG 2 Series A-5-a, vol. 6177.

22. Minutes of meeting, 18 August 1961, LAC RG 24 Acc 2000-01321-X, box 67, file 5115-91/S48 pt 1.
23. E.H. Armstrong to Williams, 17 October 1961, LAC RG 24 Acc 2000-01321-X, box 83, file 5341-2 pt 1.
24. NUDET STOVEPIPE REPORTS, 11 March 1963. LAC RG 24, vol. 19436, file 2426-4-2.
25. A.E. Wrinch to Commands, D Sigs, D Wks, Annex B, 18 September 1961, LAC RG 24 2000-01321-X, box 83, file 5341-2 pt 1.
26. Wrinch to Commands, 11 October 1961; Wrinch to Commands, 18 October 1961; Report of meeting with Railway Representatives, 26 October 1961, LAC RG 24 Acc 2000-01321-X, box 83, file 5341-2 pt 1.
27. Lieutenant-Colonel E. Churchill to DPW, DOT, DNR, DOF, DA, DNHQ, DNR, RCMP, Citizenship, 21 September 1961, LAC RG 24 2000-01321-X, box 83, file 5341-2 pt 1.
28. Graham to Churchill, 24 October 1961, LAC RG 24 Acc 2000-01321-X, box 83, file 5341-31/7.
29. Fleury to R.W. Moncel, 6 November 1961, LAC RG 24 Acc 2000-01321-X, box 67, file 5115-91/S48 pt 1.
30. Westcom to AHQ, 10 January 1962, *ibid.*
31. Major A.J. Arcand, 12 Wks Coy to Command Engineer, Edmonton, 9 January 1962, LAC RG 24 Acc 2000-01321-X, box 83, file 5341-2 pt 2.
32. Chief Superintendent J.H.T. Poudreste to Officer Commanding RCMP, 28 November 1961, LAC RG 24, vol.19436, file 2426-4-2 pt 3.
33. Colonel G.K. Wade to DD Wks Spec, 2 October 1961, LAC RG 24, 2000-01321-X, box 83, file 5341-2 pt 1.
34. Sparling to Moncel, 5 December 1961, LAC RG 24 Acc 2000-01321-X, box 83, file 5341-2 pt 2.
35. Eastern Command to AHQ, 26 January 1962, LAC RG 24 Acc 2000-01321-X, box 83, file 5341-2 pt 1.
36. Sparling to Moncel, 29 December 1961, LAC RG 24, Acc 2000-01321-X, box 83, file 5341-2 pt 2.
37. Canarmy to Cencom, 16 January 1962, LAC RG 24 Acc 2000-01321-X, box 83, file 5341-31/7.
38. Moncel to Rockingham, 6 November 1961, LAC RG 24 Acc 2000-01321-X, box 67, file 5115-91/S48 pt 1.
39. Plan 05-T94, LAC RG 24 Acc 2000-01321-X, box 83, file 5341-31/7.
40. R.G. Robertson to E.B. Armstrong, LAC RG 24 Acc 2000-01321-X, box 83, file 5341-2 pt 2.
41. For more detail about the program to train 100,000 civilians into special Militia rescue units in the fall and winter of 1961-62, see Andrew Burtch, *Give Me Shelter: The Failure of Canada's Cold War Civil Defence* (Toronto: UBC Press, 2012).
42. Donald Fleming, *So Very Near: The Political Memoirs of the Honourable Donald M. Fleming*, volume 2 (Toronto: McClelland and Stewart, 1985), p.77.
43. Thomas L. Powrie, "Crisis in Canada's Economy," *Challenge* 11, no.2 (November 1962), pp.22-25.
44. Project Justification, Vote 203 Primary 81 – September 1962, LAC RG 24 Acc 2000-01321-X, box 67, file 5115-91/S48 pt 1.
45. A.E. Wrinch to M.G. Rothschild, 27 September 1962, LAC RG 24 Acc 2000-01321-X, box 67, file 5115-91/S48 pt 1.
46. "Austerity Plan Cripples Survival Program," *Globe and Mail*, 28 August 1962.
47. *Ibid.*
48. Annex B, Wrinch to Commands, 18 September 1961, LAC RG 24 Acc 2000-01321-X, box 83, file 5341-2 pt 1.
49. Canada. Canadian Army, Director of Ordnance Services, *Scales of Issue for National Survival Material* – CAF S23-300 April 1963, (Ottawa: Queen's Printer, 1963), Scales No. 19, 20, and 22.
50. CC 2426-4(G) "Operations under Fallout," 26 February 1963, LAC RG 24, vol. 19437, file 2426-4/23/0 pt 4.
51. Each Command periodically updated the status of their construction program. The finding above is based on a review of the status of Central Command's NDFRS outposts as of 1 June 1963 found in file LAC RG 24, vol.19437, file 2426-4/23/0 pt 4. Other commands reported similar results.
52. Rothschild to ADM, 11 February 1963, LAC RG 24 Acc 2000-01321-X, box 67, file 5115-91/S48 pt 1.
53. Patterson to MacDonald, 19 March 1966, LAC RG 84 A-2a, vol.2097, file U-165-3 Plans.
54. In a memo to headquarters at CFB Montreal, the Western Quebec District Command noted a number of posts that could not be reached. In one case, the post was located at the bottom of a dam at Barrage Bourques. In another case, a shelter located at a pulp mill in Rowanton, Quebec was not visited because the mill had burned down two years previously, and the logging roads were too hazardous. Most interestingly, the staff officer responsible remarked that most shelters that were located outside train stations had been broken into, so very little equipment remained to be retrieved. Lieutenant P.R. Bova to Headquarters, 11 September 1968, LAC RG 24, vol. 22402, file 7810-1.
55. For example, the CPR station-turned local museum in Cudworth, Saskatchewan preserved the shelter, even though the Army stripped it of its contents. The same is true of a former rail station repurposed as a municipal library in Eatonia, Saskatchewan. Telephone interview with Cudworth town office; E-mail correspondence with Eatonia Town Office.

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