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Projects Rustic, Ease, and Bridge, 1958-1963

Sean M. Maloney

"Mr. President, I would not rule out the opportunity to preserve a nucleus of human specimens. It would be quite easy, at the bottom of some of our deeper mineshafts...nuclear reactors could provide power almost indefinitely, greenhouses could provide plant life, animals could be bred and slaughtered! Of course it would be vital that our top political and military men be included to foster and impart the required principles of leadership and tradition...They would breed quite prodigiously, eh? There would be much time and little to do. With the proper breeding techniques and a ratio of say ten females to each male, I would guess they would work their way back to the present gross national product in twenty years. "

Dr. Strangelove

During the Cold War, many NATO governments developed highly secret contingency plans to maintain the continuity of government (COG) during and after nuclear attack. Canada was no exception. COG planning generally consisted of several elements including legal mechanisms and constitutional matters; document duplication and storage; skeleton bureaucracies; dispersion; transportation; and shelter. All were necessary to keep Canada functioning as a nation in the face of an attack by Soviet atomic and hydrogen bombs. The most misunderstood element of COG planning has been the shelter component. Critics of civil defence programmes argued that protecting government leaders in shelters and not providing similar facilities to the population as a whole was "undemocratic," designed to maintain the "power elite."¹ The reality of Canada's COG programme was quite different from this propaganda line and its ability to protect the country's leaders in underground facilities was much more limited than alleged. This study will concentrate on the strategic context, physical arrangements and concepts of operation developed to maintain the continuity of Canadian government in the era of the greatest danger during the Cold War, 1958 to 1963.

Dr. Strangelove notwithstanding, Canada's initial COG planning did in fact focus on using mineshafts as interim underground COG sites. In July 1947, the armed force's Joint Planning Committee asked the Department of Mines and Resources to survey and report on the number, size, depth and access to transportation nodes of major mines in Canada. Little was done beyond this until the Soviets conducted their first successful thermonuclear test. Up to this point, thinking was geared towards dispersing industry and government, possibly providing above ground concrete shelters to house both.² The owners of the Silica Sand Workings at Bell's Corners (on the outskirts of Ottawa near Kanata) offered the use of their mine to the Government. Analysts concluded that the mine was capable of supporting a small command centre, with limited storage space. The mine was essentially a descending 14' by 14' tunnel going from the surface to a depth of 120 feet. This project was, as one document cryptically notes, "superseded by events," probably information that the Soviet Union had exploded a hydrogen bomb in the megaton yield.³

The introduction of Soviet megaton-yield nuclear weapons and their attachment to intercontinental bombers and ballistic missiles drastically altered NATO conceptions on how a war would be fought. This, in turn, radically affected Canadian defence planning and seriously stimulated the Diefenbaker government's COG policy. In basic terms, Canadian COG policy was structured to operate within the context of NATO's strategic concept MC 14/2. This strategic concept, arrived at by consensus within NATO, was based on a two-phase pattern of war:

Phase I: A period of violent large scale organized fighting of a comparatively short duration, not likely to exceed thirty days, the first few days which would be characterized by the greater intensity of nuclear exchange.

Phase II: A longer period of indeterminate duration for reorganization, resupply, and the accomplishment of necessary military tasks leading to a conclusion of the war.⁴

Phase II could last months or years.

The role of North America in MC 14/2 was twofold. Canadian and American air and naval defence forces had to protect the United States Air Force's Strategic Air Command (SAC) bases so that Phase I could end as quickly as possible in NATO's favour, and they had to protect or at least limit damage to the population and mobilization base in North America. Conventional and reinforcement forces to defend and/or re-take Europe had to be mobilized from this base in Phase II, since practically all of these forces would come from Canada and the United States. Continuity of Government was thus vital so that defence forces could be commanded as effectively as possible in Phase I, and so Canadian and European society would continue to exist during and after Phase II.⁵

Canada's government, then, had to survive for up to 30 days against a sustained nuclear attack in the first few days and sporadic nuclear attack for three more weeks, command defence forces during the first 30 days of a nuclear war, and then rebuild and recover those portions of the country suffering from direct nuclear attack and fallout afterwards. This seems incredible, given the commonly-perceived gargantuan size of the superpower's strategic nuclear armouries. Readers should remember, however, that NATO possessed overwhelming strategic nuclear

superiority in the 1950s and 1960s. The Soviet Union could not destroy the world 15 times over yet (as it could in the 1970s when it achieved strategic parity with the United States) and their 200 or so long-range strategic bombers and 14 missile-launching submarines⁶ had, in the 1959-1961 period, to contend with significant air and naval defences protecting North America. Even by 1963 the Soviets possessed only about 100 Intercontinental Ballistic Missiles (ICBMs), none of which were very accurate.

After a nuclear attack, Canada's leadership would have to piece together a shattered country in addition to carrying on a war. One estimate of resources in Canada two days after a nuclear attack concluded that, "out of a pre-attack population of 18,238,000, approximately 1,105,000 are estimated to have been killed and 803,000 injured by direct effects of the attack."⁷ As well, 710,000 people were estimated to be trapped but relatively uninjured in some areas, requiring rescue. A further 2,773,000 people were estimated to be in heavy to medium fallout-contaminated areas, of which about 50 per cent would die in the long term and the rest subject to lengthy hospitalization.

Unfortunately one-fifth of the hospital facilities in Canada were assumed to be destroyed. The road network survived but the rail network was severely damaged since it had nodes in most major cities. Long distance telephone service between eastern and western Canada was down at Winnipeg, though broadcast communications survived, as did 75 per cent of the petroleum refineries, and 80 per cent of the electric generating capability. (Planners did not yet understand the effects of electromagnetic pulse). On the plus side, "94% of fisherman and their boats and gear have survived the attack unscathed."⁸ A lot of Canadians would be relying on fish as a staple food in a post-attack environment.

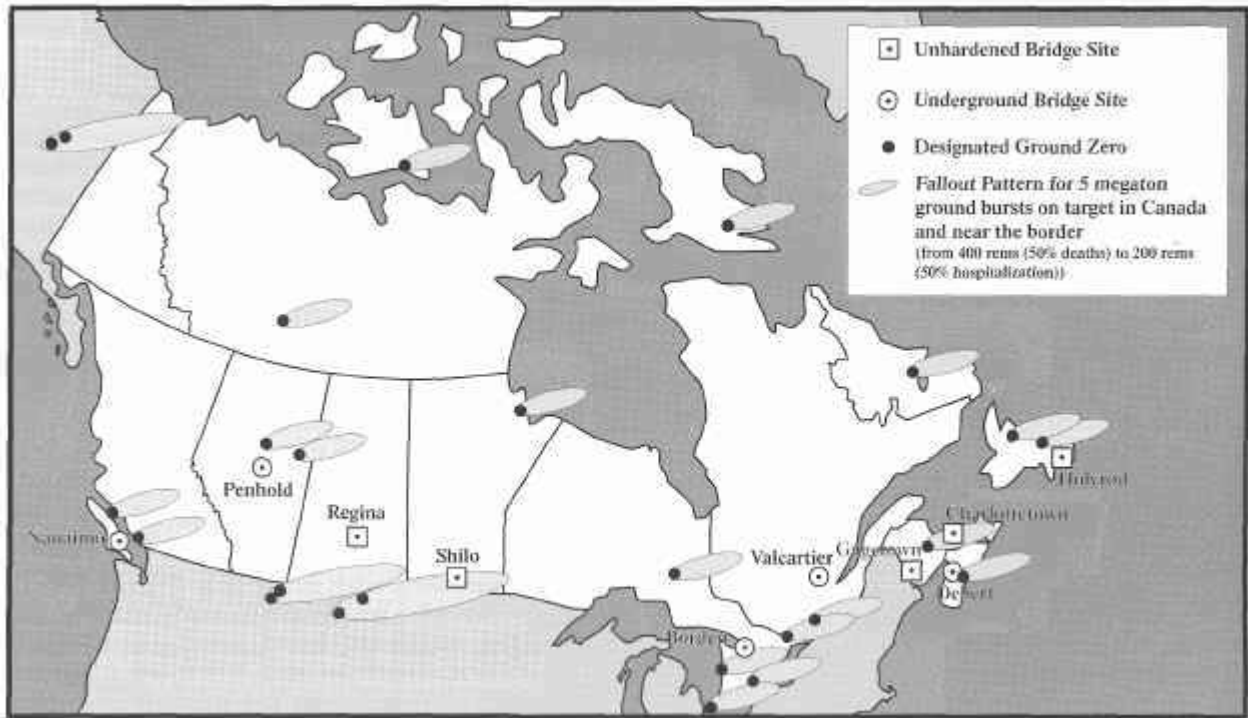
The St. Laurent government recognized the need to plan for COG but was voted out of office before any serious work could be undertaken. This early planning revolved around the mass evacuation of major cities but it was never implemented.⁹ It was up to R.B. Bryce, the Secretary of the Cabinet, to remind the Diefenbaker government in 1957 that there could be dire consequences if COG were neglected:

The nature of the threat to Canada is now such, as you are well aware, that unless active civilian preparations are undertaken there is a very real danger that under attack the country would not hold together as an economic and political entity. This in turn would prevent the conduct of effective military operations.¹⁰

The original Cabinet working group established under St. Laurent was refurbished and served as the mechanism to coordinate COG, national survival, and civil defence measures. Eventually the Emergency Measures Organization (EMO) was established in June 1957 to coordinate COG planning alongside the Department of National Defence. EMO also represented Canada on the NATO Civil Emergency Planning Committee, a body which exchanged information between NATO countries on such matters.¹¹

By mid-1958 some semblance of a COG policy was "in-being."¹² Diefenbaker's staff had developed minimal COG requirements which served as the basis for an implementation programme. These included requirements for decentralized, secure, alternate headquarters outside of Ottawa and the provincial capitals; communications to link them; and an emergency national broadcast capability. Thought was given to making use of existing above-ground buildings, but the planners concluded that "(a) few will probably have to be built to be able to operate notwithstanding heavy radioactive fallout in the area and possible nuclear explosions near by, taking into account the special danger we face in Canada from bombs exploding as a result of the main air battle over our heads."¹³ An "Emergency Communications Centre" was envisioned and the planners noted that "the existence of [the] various sites is bound to become known but we wish to keep the real nature and importance of them as secret as possible."¹⁴ The broad outlines of the COG programme were announced by the Prime Minister in August 1958.¹⁵

Incredible though it seems, the minimal COG requirements (and their implementation sequences) were developed without the creation of a formal threat estimate by the COG planners. Threat estimates did exist, as the Diefenbaker government was immersed in overhauling Canada's air defence system, but there is no indication that COG planners in 1958 or 1959 had direct access to them. They probably relied



Map 1 - Canada and the Nuclear Threat, 1961-1963

on informal information provided by DND and the RCAF, or through NATO channels. Warning time, based on the DEW and Mid-Canada radar lines, was assumed to be three to four hours. For some reason planners used a hypothetical 5 megaton Soviet weapon ground burst as the nominal threat posed to Canadian targets, and this affected the specifications for the permanent COG facilities. Ground bursts produced exponentially more fallout over a wider area.¹⁶

Concurrent with the Diefenbaker government's interest in COG and in response to the adoption of MC 14/2 as the overall strategic concept, DND and the Chiefs of Staff Committee explored methods aimed at improving the survivability of the various military headquarters which were, at that time, located in temporary wartime buildings in Ottawa.¹⁷ Between 1958 and 1960 both parties developed three primary COG projects: RUSTIC, EASE, and BRIDGE.

Prior to 1958, the Army had an interim plan to use the Civil Defence College at Arnprior, Ontario as an emergency DND headquarters if Ottawa were attacked. Arnprior was a former RCAF station and possessed an airfield, but had no fallout protection or underground buildings. It was upwind of any nuclear attack on Ottawa and was near a mid-sized town which had adequate utilities to support an interim headquarters. These arrangements were informal and not cleared with the College.¹⁸

More detailed and formal planning was conducted in earnest with the initiation of the rather dangerous Berlin Crisis in 1958. EMO proposed a four-part COG programme: 1) create an interim DND and Government emergency headquarters outside of Ottawa; 2) remove from Ottawa and decentralize as much of the federal government as possible without loss of efficiency in peacetime; 3) construct a permanent 250-man underground building to replace the interim emergency HQ; and 4) develop back-up headquarters at dispersed locations.¹⁹

The location of the interim government headquarters was code-named RUSTIC. In general terms the RUSTIC site was to accommodate 250 people and had to be able to operate on a few hours notice. There were two competitors for the RUSTIC site: the RCAF base at Trenton, and Camp Petawawa. Some thought was given to using Kingston, but there were too many other important command and communications facilities already located there. Petawawa won out. It was in a less sparsely populated area and Trenton could receive doses of fallout from targets hit in the United States.²⁰

Camp Petawawa was a standard Army base consisting of permanent and semi-permanent buildings dispersed over a wide area. RUSTIC occupied the old training and administration building and four other smaller buildings. Its

communications were spread out all over the camp. All five basements were modified to include air filters and sealant *to* protect them from radioactive fallout. RUSTIC was, therefore, quite crowded. Camp Petawawa functioned as both the emergency DND headquarters in addition to the interim civilian government headquarters. Additionally, its communications were less than adequate to handle command and control for all three services (which used three different communications systems), the RCMP communications system, the Canadian Broadcasting Corporation, External Affairs' diplomatic system, and intelligence links.²¹

Despite its rudimentary appearance and its *ad hoc* nature, RUSTIC was in all respects a highly classified facility:

...the existence of this site, Its location, and the Intention to transfer the central operations of government to it In an emergency were classified as TOP SECRET [and] that Information concerning these matters, or about RUSTIC generally, should be given to other governmental officers on a strictly need to know basis....²²

A cover story was prepared to preserve RUSTIC'S real purpose. In case anybody asked, the buildings were trial facilities set up temporarily as an Army command post for an exercise.²³ RUSTIC had to soldier on until the permanent underground facilities were built.

There was some discussion regarding dependents. Should the wives and families be told? Justice Minister Davie Fulton thought that families should be advised that, in an emergency, RUSTIC personnel had duties outside Ottawa and that they "would get in touch with them as soon as possible afterwards. This would enable families to make appropriate preparations ahead of time."²⁴ These details were left ambiguous by the emergency planning committee and no agreement was reached.

The first serious COG deployment exercise, Exercise ARCADIA, was conducted in December 1959 while the Berlin Crisis was gathering steam. ARCADIA'S aim was to "familiarize departmental officials with the RUSTIC facilities and the procedures for manning them"²⁵ by walking through the entire alert, transportation, and manning process. The principles were given

limited warning in that they were told that an exercise would happen within a three-day span and that they would not be gone from Ottawa for more than 12 hours. Movement to RUSTIC was by Army bus, though the RCAF did practice an air movement concurrently with the ground move. A total of 135 civil servants were picked up over a three-day period at the main entrance to the Centre Block of the Parliament Buildings and at the Simpsons-Sears store at the Carlingwood Shopping Centre. Upon conveyance to RUSTIC, they were subjected to lectures like "The Effects of Large-Yield Nuclear Weapons" and other scary topics relating to projected post-attack conditions in Canada. These people were the skeleton cells for each Government department who would deploy to RUSTIC in the event of an attack and the movement was phased over three days for administrative reasons.

One important aspect about ARCADIA was the lack of a realistic warning and reaction period, that is, there was no scenario. Later exercises would, however, incorporate more detailed "nuclear attack" scenarios.

While the bureaucrats were shuttling between Ottawa and Petawawa in olive drab buses, the RCAF tested its air movement planning. There were three levels of alert for the air movement units, indicated by the code words "CRASH ACTION," "READINESS" and "EMERGENCY." Each code word would be preceded by either "RUSTIC" if it were a real attack situation, or "ARCADIA" for exercise purposes. CRASH ACTION ordered one North Star four-engined transport aircraft from 412(T) Squadron at Uplands and one Vertol 107 Labrador helicopter from 4(T) Operational Training Unit in Trenton to move to RCAF station Rockliffe in Ottawa. READINESS held the aircraft at Rockliffe on 30-minute standby. EMERGENCY ordered the helicopter to the east side of the grass area near the Peace Tower at Parliament Hill and other locations in Ottawa to pick up officials and shuttle them to Rockliffe. The North Star would then depart Rockliffe for an airfield at Bonchere, south west of Petawawa.²⁶

The December 1959 exercise included the first two steps and omitted EMERGENCY. If CRASH ACTION were given at 0817 hours, the North Star would be at Rockliffe by 0830, the helicopter would arrive at 0913 hours. Once

Armageddon taxis: In the event of nuclear war, a Labrador helicopter (Top) would be despatched to Parliament Hill to pick up the nation's leaders. It would then go to CFB Uplands where the passengers would be transferred to a North Star 4-engined transport (Bottom) for a 35-minute flight to the RUSTIC facility at Petawawa.

(CFPU PL 143744 & 107623)

EMERGENCY was ordered, it would take the helicopter one hour to shuttle the principles from Parliament Hill to Rockliffe and a 35-minute flight from Rockliffe to Bonnchere. If passengers were already at Rockliffe, this would cut down the time to ten minutes for loading and a 35-minute flight.²⁷

As noted earlier, RUSTIC was an interim facility, at least for the civilian government. RUSTIC would continue to serve as one possible emergency location for the DND leadership, later under the code-name TRIDENT. Long term civil government COG facilities were surveyed in 1959. The general concept of civil relocation had underground and above ground components. The main core of government decision-makers would be housed in three interconnected fallout-proof underground shelters located upwind of Ottawa.²⁸

The main site was planned on the assumption that it would house the Prime Minister and cabinet (24 people); the Governor-General; several justices from the Supreme Court; the Commissioner of the RCMP; and the Federal Civil Defence Coordinator. The skeleton bureaucracy, approximately 80 people from each federal government department for a total 900, would occupy requisitioned buildings in several Ottawa Valley towns (known as Federal Department Relocation Sites (FDRS)). These sites theoretically would serve as rallying points first, and then function as bureaucratic entities later. Staff would be billeted in local homes.²⁹



The FDRS locations were based on their proximity to Ottawa and the fact that they were upwind. Surveys indicated that the best buildings were schools with basements. External Affairs was to deploy to the Ontario Agricultural College at Kemptville, while the Post Office would move to the Post Office building at Renfrew. A wartime censorship group would occupy the Pembroke post office. The CBC got the Federal Building in Smith's Falls. Other departments would head for Almonte, Carleton Place, and Arnprior.³⁰

The design and location of the permanent emergency federal government underground facility underwent several evaluations. Original plans envisioned three interconnected



Map 2 - The RUSTIC Plan, 1959-1960 and Federal Department Relocation Sites

underground buildings: a communications centre, an administrative centre, and an executive centre. Each would house 500 people. Some planners considered this to be too vulnerable: all three buildings, though underground, were clustered together and there was only one communications centre. An alternative was to split the communications between two 750-man buildings and put more distance between them. This lowered the administrative efficiency of the complex and increased costs, since communications would have to be duplicated.³¹

The main underground structure protection specifications included the need to withstand 100 pounds per square inch overpressure, and

to provide protection against other nuclear weapons effects like heat and radiation. In other words, the facility had to be able to survive an explosion from a five megaton nuclear weapon exploded no less than 1.1 miles away. These were the balanced and optimum specifications. Planners noted that:

It is possible to construct underground installations capable of withstanding the blast of a nuclear explosion somewhat nearer, but the limited increase in the chance of survival afforded by this extra degree of protection would not appear to warrant the greatly increased costs involved.³²

Furthermore:

...since the installations could be destroyed by deliberate attack on them, if their locations were known and a sufficient number of weapons were employed, it is proposed to improve the safety factor by assigning personnel to [two executive] structures...to give each a capability of carrying on central government independently....If more than two executive structures should be provided later, the

difficulty to an enemy of destroying them all by deliberate attack would be correspondingly increased.³³

Thus, the site's primary protection was concealment, followed by the physical protection provided by the structures themselves.

The sites were useless without communications and great pains were taken to ensure that there were enough redundant land-line telephones, cryptography machines, teleprinters, transmitters, and receivers built into the plans. Dispersion, not hardening, was the key here.

The main problem was cost. Ideally, there should have been several dispersed underground

sites in the Ottawa Valley area, each with its own main communications suite and a backup. The finalized plan reflected compromise and consisted of one large underground building and three widely dispersed antenna farms, one of which contained an underground transmitter facility. Planners left open the possibility that more sites could be added later if funds were made available.

The Government of Canada expropriated pre-selected private land, to the hue and cry of Members of Parliament representing the towns of Carp, Almonte, Dunrobin, and Perth.³⁴ This presented COG planners with a conundrum. What exactly was the cover story for these facilities? The initial press release on 6 August 1959 stated that:

The Canadian Army has received approval to construct an Experimental Army Signals Establishment in the area of Carp, Almonte, and Arnprior. This will involve a number of transmitting and receiving facilities and buildings to service them.³⁵

Experimental Army Signals Establishment or EASE became the cover name for this group of structures, probably because there was an experimental signals facility located near Shirley's Bay west of Ottawa and just north of the planned sites. The proper name for the Carp facility was the National Emergency Headquarters. It was later changed to the Central Emergency Government Headquarters.

EASE consisted of antenna farms located at Dunrobin, Robertson (near Perth), and Almonte. Robertson, the transmitter site, had a two-level underground bunker manned by signals personnel. Dunrobin and Almonte were receivers. The main site at Carp was an underground building built on the site of William Montgomery's gravel pit by The Foundation Company of Canada. It was completed and manned early in 1962, in time for the Cuban Missile Crisis.

EASE had four underground levels. The bottom floor was a huge vault, which belonged to the Bank of Canada. The third had messes and living quarters. The second floor had offices and the operations centre. The operations centre was equipped with a device called an "Iconorama," which was a large electric map-like

display for updates and situation reports. The first floor contained an infirmary, heat and ventilation units, and more working spaces.³⁶

EASE was located within a five-minute drive from a Department of Transportation airport. The Carp airport was capable of handling all types of transport aircraft and helicopters.

Construction on EASE continued into late 1961. EASE, unfortunately, came under very public scrutiny while under construction. The press did not buy the cover story. The first report came out in the *Ottawa Citizen* in April 1961, though the author was unsure as to what extent the Carp facility was to be used to store important records and to what extent it was a relocation site for the leadership.³⁷ This was mostly speculation based on a "leak." Later the *Toronto Telegram* deliberately and seriously compromised the security of the EASE site at Carp. Journalists flew over the site in a private plane and photographed it. The resulting photograph, along with a banner headline "This is the Diefenbunker!" accompanied by an arrow pointing to the unfinished site, appeared on 11 September 1961. Reporters canvassed the Carp locals in an effort to glean more information and came away convinced that it was a three-level structure, 80 feet underground, with accommodation for 400 people and supplies for six weeks of operations.³⁸

The EMO director, R.B. Curry, suggested to Minister of National Defence Douglas Harkness that further press releases should be used to deflect media speculation with a gradual release of some but not all information. One path was to rename EASE as the Canadian Army Signals Establishment, billing it as the main communications centre for the Army. The aim here was to emphasize its "peacetime" role and de-emphasize its "wartime" role.

Curry also thought that revealing the existence of similar regional underground facilities (called BRIDGE sites, discussed below) and implying that Carp was just one of eleven sites across the country would confuse the enemy. This cross-country "shell game" would force the enemy to allocate scarce resources in an attempt to "take out" Canada's leadership. They could not be sure which site the Prime Minister and the military leadership were in.



Two views of the EASE facility or the National Emergency Headquarters at Carp, west of Ottawa



Were they, in fact, ensconced in EASE? In RUSTIC? In one often BRIDGE sites? Could the Soviets afford to allocate 12 of the potentially 250 weapons deliverable against North America just to destroy Canada's leadership when they had more pressing targets like 50 primary and 100 secondary SAC bases and the American command and control system, which itself was in hard, dispersed shelters?³⁹

Project BRIDGE, as originally conceived in 1959, was not intended as a "shell game" deception scheme for the federal government. In alignment with the RUSTIC/EASE projects, COG planners wanted interim and permanent provincial facilities. Originally called "Little RUSTIC" and later changed to BRIDGE,⁴⁰ this project was to situate an operational headquarters in each province to: 1) provide a base to direct the functions of federal and provincial emergency government; 2) house a command element for Army forces engaged in National Survival operations; and 3) protect the cross-country Canadian Army Signals System nodes, upon which Phase I and Phase II military operations were dependent.⁴¹ Other functions were later added. Effective COG, civil defence, and national survival planning depended on the speed of transfer of accurate information both to the population and to the central government. The public needed to be warned of an attack and the National Attack Warning System, based primarily on sirens, was established to do just that. These devices needed activation and the BRIDGE sites could provide this. Similarly, the government and military leaders needed to know just what damage had been done to the nation. A series of National Defence Fallout Reporting Posts were established in un-hardened shelters near each metropolitan area in Canada. If these areas were hit, this information was to be passed on to the BRIDGE site and forwarded to EASE

and RUSTIC. Duty staffs continuously kept track of meteorological conditions so that fallout patterns could be determined and reported as soon as possible.⁴² The standards for interim BRIDGE site construction were similar to RUSTIC, in that:

...the buildings and communications be built to enable operations to be carried on despite heavy fallout conditions, but that no special effort be made to safeguard the units against blast damage. It is considered that these units will hardly be important enough to be targets for attack...⁴³

In fact, one COG planner noted that:

It is not considered either possible or necessary to keep secret the nature, purpose, or locations of these regional emergency headquarters. They are not considered large enough or vital enough individually to be likely to constitute a target for a nuclear weapon...The knowledge that these units are being built and manned would give the public some assurance that the Government is doing what is possible to prepare for even a missile war, despite the impossibility of intercepting the missiles themselves. This visible action by the Government in cooperation with the Provinces would help convince the Canadian people that the situation warrants their taking action to safeguard themselves against fallout. Moreover, the knowledge of these regional projects may help to confuse the potential

attacker about the significance of the EASE signal centre at Carp.⁴⁴

Some quarters did not like this proposed open information policy. The concentration of several provincial, federal, and military functions, particularly the co-location of the communications nodes with them, dictated the need for a cover plan. The existing cover plan for the federal centre at Carp, that of an Army signals facility, was also used for the permanent BRIDGE sites that were under construction. They were referred to as "Canadian Army Signals Stations." Thus the COG planners had to deny that these sites had anything to do with provincial COG and its relationship to the federal government COG planning. Consequently, revealing that they were regional COG sites for propaganda purposes was counterproductive.⁴⁵

Eventually, EMO and the Army developed a joint information security policy. Any relationship between the BRIDGE sites and EASE was Top Secret. The specific locations of the permanent BRIDGE sites and their relationship to each other was Secret. Any matters not related to weapons effects and structural design was Confidential, leaving any other information, including design, Restricted.⁴⁶

The Prime Minister, however, thwarted the information policy in 1961 when he announced in Parliament that the Government was to construct several regional wartime provincial headquarters. The actual contract tenders for "underground bunkers" was highlighted by the Opposition in Parliament in January 1961 to embarrass the Government after a dramatic story in the *Financial Post* told readers to "watch for big war citadel contracts soon."⁴⁷ Officials played down the speculation, though the press started to take more interest, which culminated in the Toronto *Telegram* revelations discussed earlier.⁴⁸

Project BRIDGE consisted of ten planned underground complexes, one in each province, [see Fig 3.] The interim BRIDGE sites were located in the basements of existing buildings and even in a rubber factory in Holyrod, Newfoundland.⁴⁹ The permanent BRIDGE sites were similar to EASE in terms of layout, with a smaller communications capability. Each site was a two-storey underground bunker with 6,365 square metres of floor space and had two

dispersed antenna farms (one to receive and the other to transmit) and an underground staff/receiver building. Since the degree of protection and control was different for each province, there were several types of BRIDGE buildings. For example, Ontario (BRIDGE 5) and Quebec (BRIDGE 6) had 58,400 square feet facilities with a manning level of 275 people, while Saskatchewan (BRIDGE 3) was programmed for 43,200 square feet and 191 people.⁵⁰

It should be noted at this point that some COG planners thought that the buildings were too small. One recommended that, "by eliminating the females from the staff a great deal of space could be saved." This clearly ruled out breeding prodigiously and preserving a nucleus of human specimens.⁵¹

The lucky few selected to man each BRIDGE site in an emergency broke down as follows:⁵² 55 federal personnel (RCMP, Health and Welfare, Agriculture, etc); 68 provincial (including the Lieutenant-Governor and the Premier); 25 Army staff (including the General Officer Commanding the military area of the province); a ten-man warning component (meteorologists); and 28 housekeeping staff (medical, cooks, plumbers, electricians). Finally, there were the all-important communicators, 83 of them, to handle the myriad of signalling equipment.⁵³ Each site had to handle several types of communications. Warning of an attack had to come in from EASE or elsewhere and be passed on by BRIDGE to the national attack warning system. Information from the nuclear detonation reporting stations and radiation monitoring stations after an attack had to be passed to EASE. Some BRIDGES acted as relay stations for information moving from EASE to distant BRIDGES. Re-entry columns had to be commanded. All of this entailed high frequency radio, landlines (telephone and teletype), a tape relay system, and telemetry from remote RADIAC sensors. All sites had on- and off-line crypto equipment, including the KW 26 machine. Project BRIDGE also possessed a new high-tech system: the Muirhead Facsimile Recorder. A highly secret instrument, MUFAX was one of the first operational fax machines. MUFAX was a large device and allowed BRIDGES to pass on entire maps marked with predicted fallout and weather patterns.⁵⁴

The construction of Project BRIDGE'S permanent facilities ran into several delays which severely limited its usefulness during the Berlin and Cuban Missile Crises. Reduced COG funding in 1960 reduced the number of approved permanent sites to six, all of which were to be constructed on existing military bases: Nanaimo, British Columbia; Penhold, Alberta; Shilo, Manitoba; Borden, Ontario; Valcartier, Quebec; and Debert, Nova Scotia. The other provinces had to make do with interim BRIDGE arrangements.⁵⁵ Shilo was continually plagued with labour strikes for two years.⁵⁶ In November 1962, right after the Cuban Missile Crisis, none of the permanent BRIDGE sites were fully equipped or manned.⁵⁷

More importantly, the Government had not provided funding to expand the Royal Canadian Signal Corps so that the sites could be manned by trained signals personnel. The Army's signal capability was stretched to the maximum by 1961. In addition to EASE and BRIDGE, the Signal Corps was expected to maintain signal squadrons in the Congo, another in Germany with the NATO forces there, in Egypt with United Nations Emergency Force I, and on other peacekeeping operations world-wide. Each Canada-based brigade group earmarked for NATO or UN deployment also needed signals capability. This precluded supplying between 60 and 90 signals personnel each to EASE, RUSTIC, and the ten BRIDGE sites.⁵⁸

So much for the physical characteristics of the COG system. How was it supposed to work in wartime and how did the system behave during the Berlin and Cuban crises in 1961 and 1962? The best indications of this are provided by COG and civil defence exercises conducted in the early 1960s and their estimates as to the nature of the threat.

The best threat estimate available to COG planners was made available in 1960. In honest language, a Secret EMO planning guide admitted that "The scale and pattern of attack on North America in general or on Canada in particular cannot be predicted with any accuracy."⁵⁹ This did not prevent planners from providing some logical assumptions. North America would be attacked after escalation from other events or at

the start of a general war as a surprise attack. Conventional attack was unlikely. No form of nuclear attack on North America would leave Canada untouched. Weapons yields would be between five and 20 megatons.⁶⁰

EMO figured that there would be little strategic warning. Tactical warning for a manned bomber attack was two to four hours, ICBM's 30 minutes, and 15 minutes for submarine-launched missiles. There may be additional warning "since the bases of U.S. retaliatory forces are likely to be primary targets, and population centres might be left to a follow up attack."⁶¹

Laudably, EMO was not blind to technological change. For the 1960 to 1961 period, the planners noted that the enemy would rely on manned bombers, supplemented by very small numbers of ICBMs and submarine-launched missiles. The ratio for the 1962-1963 time frame was reversed, with reliance placed on missiles, with bombers used to supplement. Between 1964 and 1970 the attack was postulated to consist of large numbers of missiles and air-launched cruise missiles.⁶²

The prescient planners made a very important prediction. Once the United States moved from bombers operating from airfields to hardened missile sites, the probability was high that the Soviets would shift their targeting away from the sites and against the command structure, which would alter the fallout patterns and produce less fallout onto Canada. Alternatively, the enemy might choose a psychological strategy intended to intimidate the population by targeting a small number of cities, probably those capable of supporting NATO operations in Europe (like Montreal, Quebec, and Halifax) in the hopes that Canada would withdraw from a war.⁶³

What did all of this mean for the Canadian COG system? If an enemy attack followed a counter-force pattern against American Strategic Air Command bases, the COG system as it existed between 1960 and 1963 would probably have been adequate, since damage to Canada would be less than other forms of attack. There was, of course, the probability that weapons from aircraft destroyed over Canada or delivered by error would cause random damage. This was very different from earlier thinking in which all

major Canadian cities would be attacked indiscriminately.

Exercise TOCSIN 1960 (tocsin is an alarm sounded on a bell) held on 3 May 1960 was designed to test the existing COG and national survival systems at all levels, specifically the manning of COG facilities. The staffs had three hours warning time to deploy to the sites and establish minimal communication. The specific movements and identities of participants and the lessons learned have been obscured with time, but there are indications that the BRIDGE staffs were unable to work effectively as teams and that the communications system became rapidly overloaded with traffic.⁸⁴

TOCSIN 1961, held on 5-6 May 1961, operated on similar assumptions as TOCSIN 1960. It was structured to practice manning the interim BRIDGE sites, the partially-completed BRIDGE 5 at Camp Borden, and RUSTIC. Other exercise objectives involved testing the communications system and the National Attack Warning System sirens. An additional objective was "to make the general public conscious of survival operations."⁶⁵

TOCSIN 1961 also featured relocating the Ministers of National Defence, Health and Welfare, Defence Production, and the Solicitor General to RUSTIC. Air movement was not used. A special train was arranged and pre-positioned on the tracks across the Rideau Canal from the East Block of the Parliament Buildings.⁶⁶

The attack pattern appears to have been based on a counter-city scenario. The nine primary targets in such a scenario were Montreal, Toronto, Vancouver, Ottawa, Hamilton, Windsor (because of its proximity to Detroit), Halifax, Winnipeg and Edmonton.⁶⁷ Weapon accuracy was assumed to be 100% and all weapons were ground bursts. Even with three hours' warning, the final report ruefully noted that:

The scale of the attack simulated in the EMO exercise was so heavy that little action could have been taken...to influence the battle for some days. The only role left would have been to gather information, think ahead, and plan to resume centralized control when possible.⁶⁸

Conditions in BRIDGE 5 were superior to those encountered within the BRIDGE system on TOCSIN 1960. Premier Frost of Ontario and his staff were enthusiastic participants and the Army staff was a well-oiled machine. The problem again was with the civilian heads of departments who were functioning in *ad hoc* teams again to little effect and efficiency. An embarrassing glitch was revealed when someone noticed that the teletype relay between RUSTIC and BRIDGE 5 ran through Toronto, a primary target.⁶⁹ There was, apparently, no security for the special train: any derelict from the Byward Market could conceivably have boarded for a one-way trip to Petawawa.

The pressure brought to bear by the Berlin Crisis later in 1961 prompted Exercise TOCSIN B 1961. Radically different from its predecessors, TOCSIN B planners made the exercise as realistic as possible, given the actual deteriorating international situation. The Soviets embarked on a nuclear weapons test series late in August, exploding 33 megaton-yield weapons at a rate of five a week. This culminated in a massive 58 megaton test, the largest ever recorded. The Diefenbaker government implemented some COG measures and explored the possibility of partially manning EASE, RUSTIC, and the interim BRIDGE sites.⁷⁰

At this point, the siren system was not complete, nor were EASE or the permanent BRIDGE sites. Yet by 24 August, the interim sites were all operating on a 24-hour basis. The installation of communications at EASE was accelerated, with a limited telephone capability available by November.⁷¹

TOCSIN B was held on 13-14 November. It featured an attack pattern that was coordinated with the North American Air Defence Command's (NORAD) latest air defence exercise, DESKTOP IV. The sequence of events that TOCSIN B followed included a missile attack followed by a bomber attack. It postulated 12-minute warning for missile attack, with the first detonation on US targets within 25 minutes (submarine-launched missiles), followed by five detonations against Canadian targets at the 35-minute mark (ICBMs). Enemy bombers hit NORAD radar cover at the same time as the initial missile

attacks and arrived over their targets within three hours.⁷²

Unlike TOCSIN 1961, Canadian targets included USAF Strategic Air Command facilities in Canada at Edmonton, Cold Lake, Churchill, Goose Bay, Stephenville, and Frobisher Bay; air defence bases at North Bay, Comox, and Chatham; and the cities of Ottawa, Toronto, Montreal, Vancouver, and Halifax as secondary targets. Niagara Falls and Windsor would get doses of radiation from their adjacent American targets, as would the western provinces since the scenario assumed that all SAC and air defence command bases on the Canada-US border would take hits. Canadian targets were assumed to take five-megaton hits and US targets ten, again assuming 100% accuracy with ground bursts. Only the SAC targets were targeted with more than one weapon.⁷³

TOCSIN B incorporated coordination with NORAD HQ and regions and even used the NORAD alerting procedures and code-names for states of readiness.⁷⁴ Canada added the code-name BIG SHOT to inform the COG system of fallout from missile strikes against SAC bases. Canada's leadership left Ottawa on COCKED PISTOL (DEFCON 2) before BIG NOISE/APPLE JACK (DEFCON 1) was signalled. The Cabinet and the Prime Minister went to RUSTIC, as did DND. Health and Welfare, Justice, Defence Production, and the RCMP moved to the Civil Defence College and the town of Arnprior. Transport moved to RCAF Station Uplands, while Fisheries shifted to the federal complex at Hogsback.⁷⁵

As usual, not all went well. Sixty of the 500 recently-installed NSAWS sirens did not function and the staff for BRIDGE 2 (Penhold, Alberta) did not clear Edmonton before the city was "destroyed" by a five megaton missile 35 minutes into the exercise.⁷⁶

COG procedures were under continual review throughout 1962. For example, once EASE was operational at Carp, the air movements plan to support COG changed. The North Star was gone. On order a Vertol 107 Labrador helicopter would leave RCAF Trenton for Rockliffe, where it would be held at 30 minutes readiness. On direction from Air Force HQ, it would then move to the grass area in front

of the Peace Tower and pick up no more than ten senior government officials. It would then "depart Parliament Hill for a relocation centre as directed by the senior government official present."⁷⁷ The other officials would leave by private motor vehicle for their respective sites. Federal Department Relocation Site planning was refined further, with more building surveys conducted in the Ottawa Valley to house the skeleton bureaucracy, though the biggest problem lay in determining what records should be stored outside of Ottawa and where they should be located.

The Cuban Missile Crisis should have been an opportune time to exercise COG planning, given the dire nature of the international situation. The system had undergone some manning practice during NATO exercise FALLEX 62, held in September 1962. FALLEX 62 dealt mostly with military responses to a projected international crisis and was based on a quite sophisticated crisis scenario. Civilian participation from the federal government was lacking, however.⁷⁸

John Diefenbaker's unwillingness to alert the nation and its armed forces in a timely fashion during the height of the crisis in October 1962⁷⁹ voided the millions of dollars spent on COG facilities and planning. At a time of great danger this decision made by one man could have prevented the preservation of Canada's government and, in some respects, Canadian society itself. Any supposedly efficient system is inevitably limited by "human meddling," as Dr. Strangelove would have put it.

There would be other TOCSINs⁸⁰ but the COG system would slowly decay in the face of the enemy's increased ability to deliver nuclear warheads by ICBM in the 1970s and 1980s. For a brief time, however, Canada's COG system was appropriate for the task assigned to it. It was a prudent measure, given the dangers inherent in the Cold War with its short and long term crises and ever increasing nuclear delivery capabilities. Notably, even the United States and the United Kingdom did not possess a hardened regional emergency headquarters system. Could the system have survived an initial onslaught and continued to function after 30 days during the 1958 to 1963 period? Thankfully, we did not find out.

Notes

1. Continuity of Government and Civil Defence are two separate but related concepts. Civil Defence objectives revolved around having the population protect itself as much as possible through organization and self-education, while COG was aimed at maintaining the organized structure of government itself.
2. National Archives of Canada (NAC), Record Group (RG) 24 ace 83-84/167 vol.222 file S1400-24, (29 July 1947) 102nd Meeting of the Joint Planning Committee; (16 March 1953) Joint Staff, "Underground Construction Policy" memo to the Joint Services Accommodation Committee; RG 24 vol.568 file 096/18.s.v. 1, (21 January 1952) Chiefs of Staff Committee meeting "Dispersal of National Defence Headquarters."
3. NAC RG 24 ace 83-84/167 vol.222 file S1400-24, (8 March 1954) memo Minister of National Defence to Deputy Minister of Public Works; (29 December 1954) memo to ACNS(W), "New NDHQ: Requirements."
4. (23 March 1957) North Atlantic Military Committee, "MC 14/2 (revised) A Report by the Military Committee on the Overall Strategic Concept for the Defense of The North Atlantic Treaty Organization Area."
5. Directorate of History and Heritage (DHIST), The Raymont Collection, file 995 "Extract from MC 14/2." See MC 14/2.
6. See Donald P. Steury (ed.) *Intentions and Capabilities: Estimates on Soviet Strategic Forces, 1950-1983* (Washington D.C.: CIA History Staff, 1996) pp.47, 52, 75. There were more than 200 strategic bombers, but the 600 TU-4 BULLs and 1,000 TU-16 BADGERS were incapable of reaching North America without air-to-air refuelling (an area that the Soviets were not advanced in yet) or forward basing in Alaska, Iceland, or Greenland. Canadian air defence estimates in 1958 predicted 80 long-range strategic bombers by 1961, 160 in 1962, and 200 in 1963. See DHIST 112.3M2.009 (D208) (27 June 1958) Appendix "A" to "Air Defence."
7. See DHIST file 81/246, Economic Planning Division, Canadian Emergency Measures Organization, "Resources in Canada 48 Hours After a Hypothetical Nuclear Attack, November 1963." Though this document dates from a later period, its assumptions hold for the period under discussion in this paper.
8. DHIST file 81/246, Economic Planning Division, Canadian Emergency Measures Organization, "Resources in Canada 48 Hours After a Hypothetical Nuclear Attack, November 1963."
9. NAC RG 24 vol.20736 file 5-11-1 pt.5, (15 June 1956) letter Bryce to Foulkes; (14 June 1956) Joint Planning Committee, "The Implications of the Proposed Civil Defence Policy of Evacuation of Cities on Military Planning."
10. NAC MG 32 B9 vol.29, (25 September 1957) letter R.B. Bryce to Gordon Churchill.
11. NAC MG 32 B9 vol.30, (17 April 1959) memo to the Cabinet Committee on Emergency Plans, "Progress Report on Emergency Measures Planning."
12. DHIST The Raymont Collection, file 507, (7 July 1958) Draft memo to Cabinet, "Arrangements for Carrying on Government in the Event of Nuclear War."
13. NAC MG 32 B9 vol.29, (19 July 1958) letter John Diefenbaker to Gordon Churchill.
14. *Ibid.*
15. NAC RG 24 vol.213 file 2001-91/B37pt 1, (July 1959) letter General Foulkes to Canadian Joint Staff London.
16. A five megaton weapon airburst over a city-like target would produce damage of varying degrees out to 17.5 miles from ground zero. It would produce total destruction out to 5.52 miles. A ground burst would produce more physical damage closer to ground zero and less damage further out, but the radioactive fallout would travel with the wind perhaps hundreds of miles away, thus contaminating the region to varying degrees. Thus, Canadian planners were using a worst-case damage model which might not in fact be representative of a real attack pattern.
17. DHIST 112.3M2.009(212) (26 November 1958) "Department of National Defence War Organization." For more on North Bay, see T.G. Coughlin, "City in a Mountain," *The Roundel*, June 1961, pp.24-26; K.G. Roberts, "Air Defence Goes Underground," *The Roundel*, September 1963, pp.8-13.
18. DHIST 112.3M2.009(212) (19 August 1959) CGS to VCGS, "Emergency Army Headquarters."
19. DHIST 112.3M2.009(212) (26 November 1958) Subcommittee on Wartime Headquarters: "Department of National Defence War Organization," (2 December 1958) JPC "DND War Organization," NAC MG 32 B9 vol.30, Cabinet Committee on Emergency Plans, 3rd meeting, 4 June 1959.
20. DHIST 112.3M2.009(212) (14 August 1959) DGSSO to DGSO, "Camp Petawawa versus Trenton."
21. NAC MG 32 B9 vol.30, Cabinet Committee on Emergency Plans, 3rd meeting 4 June 1959; RG 24 vol.568 file 096 118.s.v. 1, (7 December 1961) JPC, "Detailed Plan for DND Emergency Headquarters."
22. DHIST 112.3M2.009(212) (14 April 1959) Ad Hoc Committee on Civil Emergency Planning.
23. NAC MG 32 B9 vol.30, Cabinet Committee on Emergency Plans, 9th meeting 28 October 1959.
24. NAC MG 32 B9 vol.30, Cabinet Committee on Emergency Plans, 3rd meeting 4 June 1959.
25. NAC RG 24 vol. 107 file 096.103.6, (6 November 1959) "Exercise ARCADIA General Instructions."
26. RG 24 vol. 107 file 096.103.6, (9 September 1959) Air Transport Command HQ Operation Order 94/59.
27. RG 24 vol.107 file 096.103.6, (10 December 1959) "Exercise ARCADIA: Air Transport."
28. NAC RG 24 vol.20738 file 5111 vol.8 (15 April 1959) "The Organization of Government Under Conditions of Nuclear War," RG 24 vol.218 file 200191/B37V.7, (1963) "Briefing for the Minister of National Defence."
29. DHIST 112.3M2.009(D212), (12 February 1959) JPC, "Interim Programme for Emergency Government."
30. NAC RG 24 vol. 107 file 096.103.6, (7 November 1961) memo to the Cabinet Committee on Emergency Plans, "Federal Departmental relocation Sites."
31. NAC MG 32 B9 vol.30, Cabinet Committee on Emergency Plans, 2nd meeting 7 May 1959; 3rd meeting 4 June 1959.
32. NAC MG 32 B9 vol.30, (7 May 1959) memo to the Cabinet Committee on Emergency Plans.
33. *Ibid.*
34. MG 32 B 19 vol.8, file 7-15, (21 July 1959) letter R.A. Bell to George Pearkes.
35. MG 32 B 19 vol.8, file 7-15, Army Press Release 6 August 1959.
36. Interview with Thomas George, 30 April 1996.
37. Norman Campbell, "Carp War Shelter' for Federal Govt.," *Ottawa Citizen*, 11 April 1961.

38. "This is The Diefenbunker!" Toronto *Telegram*, 11 September 1961.
39. MG 32 B 19 vol.8, file 7-15, (30 October 1961) letter R.B. Curry to Harkness.
40. NAC RG 24 vol.218 file 2001-91/B-37 Pt. 1, (3 July 1959) letter R.B Curry to Brigadier Wrinch.
41. NACRG 24 vol.213 file 2001-91/B37 pt 1, (29 March 1960) "Report of Army/ EMO Working Group on BRIDGE System."
42. RG 24 vol.218 file 200191/B37V.7, (1963) "Briefing for the Minister of National Defence."; Interview with Dr. A.H.A. Maloney, 27 April 1996.
43. NAC RG 24 vol.213 file 2001-91/B37 pt 1, (11 April 1960) memo for the Cabinet Committee on Emergency Plans, "Regional Emergency Centres for Government in War."
44. NAC MG 32 B9 vol.30, (22 April 1960) memo for the Cabinet Committee on Emergency Plans, "Regional Emergency Centres for Government in War."
45. NACRG 24 vol.213 file 2001-91/B37pt 1,(14 July 1959) message Army HQ to all commands; (3 July 1959) letter R.B Curry to Brigadier Wrinch.
46. NACRG24vol.213file2001-91/B37pt 1,(1 April 1960) letter R.B. Curry to Brigadier Wrinch.
47. NAC RG 24 vol.218 file 2001-91/B37pt 3, (19 January 1961) message Army HQ to Commands; (20 January 1961) Hansard extract, p. 1256. Diefenbaker had made earlier announcements regarding regional headquarters, but they were quite vague.
48. NACRG24vol.218file2001-91/B37pt4, "We'd Liketo Know More of Bunker Plans", Nanaimo *Daily Free Press*, 16 May 1961.
49. NAC RG 24 vol.218 file 2001-91JB37 pt 7, (21 March 1963) letter Army HQ to CBC.
50. NAC RG 24 vol.549 file 096-103 v.2, (1 May 1962) Army HQ, "Turnover of Rations: Ration Scale, Special projects," vol.218 file 2001-91iB37pt 1, (29 March 1960) "Report of Army/EMO Working Group on BRIDGE System." I would also like to thank Mr. D.J. Morris for information relating to the BRIDGE site at Penhold, Alberta.
51. NAC vol.218 file 2001-91/B37pt 1,(8 April 1960) Colonel L.E. Kenyon, note to file.
52. This information is for the Ontario site, which was one of the largest. New Brunswick's site had about half as many personnel. See NAC RG 24 vol.218 file 200191 / B37 Pt. 1, (29 March 1960) "Report of Army/EMO Working Group on BRIDGE System."
53. *Ibid.*
54. Interview with Frank Krewski, 30 April 1996. NAC RG 24vol.219file2001-91/B37v.8, (9August 1963)Army HQ, "Electrosensitive Recording paper for Use in Muirhead Facsimile Recorders," Interview with Dr. A.H.A. Maloney, 27 April 1996.
55. NAC vol.218 file 2001-91 /B37 pt 3, (16 November 1960) "Progress in Construction of Communication Centres Re: Survival Operations."
56. NAC vol.219 file 2001.91 JB37 vol.6, (30 November 1962) QMG, "Completion Dates: Project BRIDGE."
57. NAC vol.219 file 2001.91 /B37 vol.6, (23 November 1962) "Completion Dates: Project BRIDGE."
58. NAC vol.218 file 2001-91/B37pt 3, (31 August 1960) D Sigs, "Teleprinter and Tape Relay Equipment: Project BRIDGE."; RG 24 ace 83-84/215 vol.26 file 1200 pt 2 vol.18, "Tasks and Aims of the Army, 1961-1963."
59. NAC RG 24 vol.11 147 file 1400-1 vol.1, (1960) EMO: "Planning Guide on the Continuity of Government Programme and Related Emergency Preparations."
60. *Ibid.*
61. *Ibid.*
62. *Ibid.*
63. *Ibid.*
64. I was unable to find an after action report for TOCSIN 1960. The problems came from a staff paper prepared in 1961, "ABRIDGESite: Its Functions and Operation" located in NAC RG 24 vol.218 file 2001.91/B37 V.4.
65. NACRG 24 vol.251 file 2001/91/T18 vol.7, (9 February 1961) "Briefing for the Chiefs of Staff Committee: Exercise TOCSIN 1961."
66. NAC RG 24 vol.251 file 2001/91/T18 vol.4, (26 April 1961) message to Army HQ.
67. RG 24 ace 83-84/215 vol.26 file 1200 pt 2 vol.15, (28 February 1961) "Canadian Army Basic Assumptions for Survival Planning and Operations."
68. NACRG 24 vol.251 file 2001/91/T18 vol.6, (31 July 1961) "Final Report on Exercise TOCSIN 1961."
69. University of Saskatchewan, Diefenbaker Centre. J.G. Diefenbaker Papers, reel 24, (29 May 1961) letter from the Chief Government Whip to the Prime Minister, "Exercise TOCSIN."
70. Cochrane *et al*, *Soviet Nuclear Weapons* pp.351-352; DHIST 114.3gi(D14), (3 August 1961) memo: "Berlin Contingency Planning."
71. NACRG 24 vol.549 file 096-103.S.V. 1,(29 August 1961) memo to Minister of National Defence, "Progress Report on National Survival Programme: Phase 1."
72. NAC RG 24 vol.251, file 2001-91/T19 vol. 1, (27 September 1961) Major General Survival to Army HQ and EMO, ""Proposed Attack Pattern: Exercise TOCSIN B 1961.""; (13 October 1961) Army HQ to EMO, "Proposed Attack Pattern: Exercise TOCSIN B 1961. " .
73. *Ibid.*
74. These were DOUBLE TAKE (DEFCON 5), ROUND HOUSE (DEFCON 4), FAST PACE (DEFCON 3); COCKED PISTOL (DEFCON 2) and BIG NOISE/APPLE JACK (DEFCON 1). See NACRG 24 vol.251, file 2001-91/T19 vol.2, (13 November 1961) "Exercise TOCSIN B 1961: RWIC/Northern NORAD Region."
75. NAC RG 24 vol.251, file 2001-91/T19 vol.1 (9 October 1961) memo to Chief of the General Staff, "Exercise TOCSIN B 1961."
76. There appears to be no after action report for TOCSIN B 1961. This information was derived from NAC RG 24 vol.218file 2001.91/B37v.8, (9 November 1961) message Western Command to Army HQ; "National Survival Sirens are Tested", *The Beaver* 15 December 1961, vol.5 No. 34.
77. NAC RG 24 vol.107 file 096.103.6, "RCAF Operation Order No. 110/62."
78. NAC RG 24 ace 83-84/215 vol.26 file 1200 pt. 4,2 vol. 19, (30 November 1962) "Final Report on the Canadian Army's Participation in Exercise FALLEX 62."
79. See Peter Haydon, *The 1962 Cuban Missile Crisis: Canadian Involvement Reconsidered* (Toronto: CISS, 1993).
80. At least one was held in 1963. NAC RG 24 vol. 11148 file 1400-1 sub, (1 February 1963) "Exercise TOCSIN 1963: General Instructions."

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