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CONELRAD BROADCAST STATION CONTROL DEVICE

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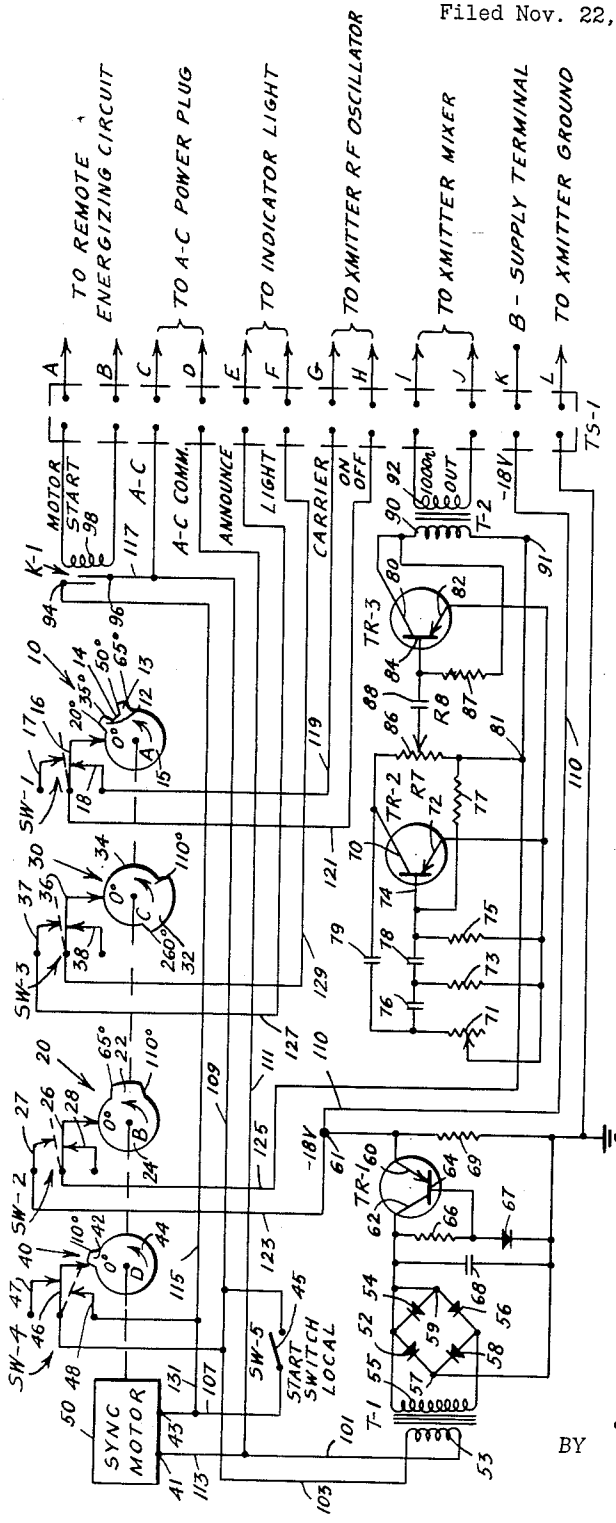

Fig. 2

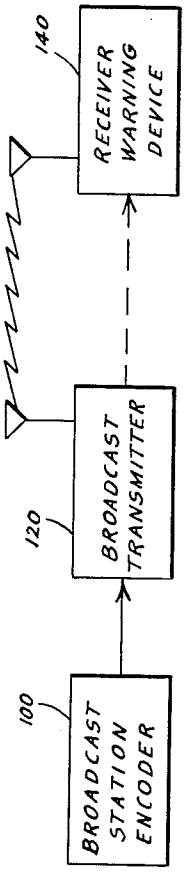

Fig. 1

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CONELRAD BROADCAST STATION CONTROL DEVICE

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This invention relates to a broadcast station control device and more particularly to a Conelrad control device for automatically controlling a standard radio broadcasting station for the development and transmission of the standard Conelrad code.

Briefly stated, the present invention relates to an electronically actuated signal encoding apparatus which will automatically transmit the standard Conelrad signal code. That is to say, the apparatus of the present invention is adapted to turn On and Off the carrier wave of a standard broadcasting station for sequential intervals in accordance with and pursuant to the standard Conelrad warning system.

At the present time, Civil Defense authorities have established and adopted a standard Conelrad code which consists of the following intervals: (1) five seconds carrier Off, (2) five seconds carrier On, (3) five seconds carrier Off, (4) fifteen seconds carrier On and modulated with a 1,000-cycle signal, and (5) an indefinite period of carrier On and audio modulated with instructions and information. Accordingly, the apparatus of the present invention, which is connected to the transmitter of the standard broadcast station, will automatically turn the carrier wave of that station Off and On during the first three intervals of the Conelrad code signal and then automatically modulate the carrier with a 1,000-cycle tone during the fourth interval of the Conelrad code. In addition, the apparatus of the present invention is adapted to actuate a visual indicator, such as a light, during the fifth interval of the Conelrad code, thereby notifying the local broadcast station announcer that it is time to modulate the carrier wave with instructions and information pertaining to the national emergency.

The instant apparatus may also be used in conjunction with the predetermined Near code, which is transmitted over pre-existing power transmission lines and networks.

Various broadcast station transmitter encoding systems and devices have been known for many years. None, however, is particularly suited for use in conjunction with the present Conelrad warning system and many of the prior known devices require highly complicated equipment and expensive circuit components. The present invention avoids these difficulties by providing a simplified, inexpensive unit which can be easily connected to a standard broadcast station transmitter so as to develop and transmit a signal code and which unit is particularly suited for use in conjunction with the standard Conelrad warning system.

Further, most of the heretofore known standard broadcast station encoding systems rely principally on the fact that, in the event of a national emergency, the broadcast station would be notified by Civil Defense authorities of the impending national emergency and would then discontinue normal transmission of the broadcast station carrier and then transmit the broadcast station carrier pursuant to the Conelrad signal code. Such systems, however, are not completely satisfactory nor effective since emergency circumstances may arise when immediate and timely notification of the national emergency cannot be relayed to the standard broadcast station. It is apparent, therefore, that systems operating on the above-mentioned principle may not adequately and timely inform the general public of the imminent and impending national emergency.

Still further, most of the heretofore known standard broadcast station transmitter control devices require specific and cumbersome procedures for attaching the device to the transmitter. Such arrangements are often objectionable in that the normal operation or use of the standard broadcast station transmitter is impaired or the cost for connecting the device to the transmitter is considerable.

In addition, the heretofore known standard broadcast station transmitter control devices require the continuous operation of the entire control device whereas the device and principles of the present invention permit conventional transistorized oscillator and rectifier circuits to be uniquely modified so as to develop the Conelrad signal code and yet not require the continuous full operation of the apparatus, thereby resulting in a noticeable economy of operation.

While the present invention may be used in a variety of civilian, industrial and governmental applications, the principle of operation makes it particularly useful for the unattended development and transmission of Conelrad code signals. Accordingly, the present invention may be used for Civil Defense purposes by operators of radio broadcasting equipment and by commercial, industrial or amateur services which are presently required by law to have available Conelrad encoding equipment in order that radio broadcasting, except for Civil Defense purposes, may be discontinued during a national emergency after the transmission of the Conelrad code signal.

The present invention avoids the above set forth difficulties by providing a simplified and inexpensive device capable of developing and transmitting a signal code indicative of a national emergency and which device is particularly suited for use in conjunction with the standard Conelrad system as well as the standard Near system.

It is therefore a primary object of the present invention to provide a novel standard broadcasting station transmitter encoding device capable of use for Civil Defense purposes by operators of radio broadcasting equipment and by commercial, industrial or amateur services which are presently required by law to have available transmitter carrier frequency encoders.

Another object of the present invention is to provide a unique encoding system for developing and transmitting a signal code indicative of a national emergency.

Still another object of the present invention is to provide an inexpensive standard radio broadcast station transmitter encoding device particularly suited for use in conjunction with the existing Conelrad warning system.

Yet still another object of the present invention is to provide a unique standard radio broadcast station transmitter encoding device which is capable of controlling the transmission of the Conelrad signal code and yet does not require the continuous full operation of the apparatus, thereby resulting in economy of operation.

A further object of the present invention is to provide a novel transmitter control device whereby the standard Conelrad signal code is automatically transmitted upon momentary actuation of the device.

A still further object of the present invention is to provide a unique transmitter control apparatus which is capable of energizing and deenergizing the transmitter so that sequential intervals of transmitter carrier wave On and Off results and to thereafter modulate the transmitter carrier wave with an audio tone signal and finally permit audio modulation of the transmitter carrier wave with instructions and information pertaining to an impending national emergency.

A still further object of the present invention is to provide a radio transmitter control device wherein an unattended standby circuit is momentarily energized in the event of a national emergency and which circuit auto-

matically actuates the transmitter of a standard radio broadcasting station in accordance with and pursuant to the standard Conelrad signal code, thereby resulting in a radio transmitted warning of an impending national emergency.

An additional object of the present invention is to provide a novel radio transmitter control device particularly suited for use in conjunction with the existing Conelrad warning system which is simple in construction, economical to manufacture and highly reliable in performing the function intended.

These and further objects and advantages of the invention will be more apparent upon reference to the following specification, claims and appended drawings wherein:

FIGURE 1 is a block diagram of a radio system in accordance with the present invention; and

FIGURE 2 is a detailed circuit diagram of the encoder portion of the radio warning device of the present invention.

While the present invention is described in conjunction with, and is particularly suited for use with, the existing Conelrad radio warning system, the present invention has utility in conjunction with other emergency warning purposes, such as general broadcast information, tornado, hurricane and other weather warnings, police and fire warnings, and other emergency warnings.

In the event of an enemy bomber or missile attack, it is well known that the general public must be immediately notified of the imminent and impending disaster so that they may take cover, evacuate and make other arrangements essential to their survival during and immediately after an attack. Accordingly, a highly reliable and accurate radio transmitter encoding device is essential so that the populace may be immediately and accurately informed of the impending national emergency. At the present time, Civil Defense authorities have established a national emergency signal code which will be transmitted via existing standard broadcast station transmitters and it is necessary to the success of this system of warning that broadcast stations have available the equipment capable of transmitting the emergency code signal.

Up to the present time, most broadcast stations have available equipment which is manually operated by employees of the broadcasting station so as to transmit the carrier frequency of that broadcast station in accordance with the national emergency signal code. One disadvantage of this type of a system is the possibility of error on the part of the broadcasting station employee in transmitting the national emergency signal code. Also, such systems prevent the employee of the broadcast station from taking cover or making arrangements for his own survival. Obviously, a system which can be remotely energized or initially energized by an employee of the broadcast station and which will thereafter automatically transmit the broadcast station carrier wave in accordance with the national emergency signal code would overcome the above-mentioned disadvantages of the presently available systems.

The novel radio transmitter control device of the present invention may be incorporated in a small transistorized container and permanently connected to the conventional transmitter of the standard radio broadcast station.

Upon receipt of a remotely originated energizing signal, or upon actuation of a start switch of the device, the device of the present invention is actuated and caused to uniquely control the transmission of the broadcast station transmitter carrier wave and to uniquely modulate the carrier frequency with an audio tone, thereby transmitting to the general public a warning pursuant to the national emergency signal code. Further, the device of the present invention is operative through an entire 24-hour day on an automatic basis so that it does not depend upon the standard radio broadcast station being on the air since it can be remotely energized to transmit the national emergency signal code.

Briefly, the device of the present invention, when energized, causes a plurality of single-pole, double-throw switches to be sequentially opened and closed in accordance with the Conelrad signal code. That is to say, the first switch is caused to open and close for predetermined periods whereby the broadcast station transmitter is energized and deenergized, thereby resulting in periods of transmission of the carrier wave separated by periods of non-transmission of the carrier wave. Another switch is adapted to connect a local oscillator with the broadcast station transmitter, thereby resulting in audio tone modulation of the carrier wave of the broadcast station transmitter. Still another switch is adapted to connect energizing potential of the control device to a visual indicator such as a light, thereby informing the broadcast station operator that audio modulation of the carrier with instructions and information can be commenced. And, finally, another switch is adapted to hold the control device in an energized position until one cycle of operation (i.e., the Conelrad signal signal code has been transmitted) has been completed, and then to deenergize the control device and place it in condition of readiness for any subsequent national emergency operation.

Referring now to FIGURE 1, wherein a block diagram of a warning system is shown, the standard broadcast station transmitter **120** has connected thereto a broadcast station encoder **100**. When the encoder **100** is energized, the broadcast transmiter **120** is caused to transmit carrier wave frequency pursuant to a predetermined national emergency signal code such as the Conelrad signal code. The transmitted signal code of transmitter **120** is received by a receiver warning device **140** and is there decoded and caused to actuate the signal responsive device such as bells, alarms, speakers, etc.

Referring now to FIGURE 2, wherein a detailed circuit diagram in accordance with the present invention is shown, a synchronous motor **50** is coupled to and drives cams **10**, **20**, **30** and **40**. Energizing voltage for the motor **50** is provided through 110-volt, 60-cycle alternating current power supply which is connected at terminals C and D of plug TS–**1** (see upper right-hand portion of FIGURE 2). The 110-volt A.C. signal is applied across the primary **53** of power transformer T–**1**. The power transformer T–**1** includes a step-up secondary coil **55** which is connected across a conventional full-wave diode bridge rectifier comprising diodes **52**, **54**, **56** and **58**. The rectified A.C. volt appears across diode bridge output terminals **57** and **59** across which is connected a filter and smoothing capacitor **68**. The terminal **57** is directly connected to ground and the terminal **59** is directly connected to the collector electrode of transistor TR–**1**. The collector electrode of transistor TR–**1** is connected to ground through a series connected limiting resistor **66** and diode **67**. The base electrode of transistor TR–**1** is connected to the juncture of resistor **66** and diode **67**. The emitter electrode **60** is connected through the load resistor **69** to ground. A negative 18 volt potential is developed across resistor **69** and is available at B— output terminal **61**.

Referring to the upper right-hand portion of FIGURE 2, there is shown a multi-terminal plug TS–**1** having terminals A to L. The specific circuit relationship and connections of terminals A to L of plug PS–**1** will be discussed more fully hereinbelow. However, it will suffice at this time to merely mention that plug TS–**1** will be inserted into a corresponding receptacle of the local broadcast station transmitter.

Referring now to the upper left-hand portion of FIGURE 2, the cams **10**, **20**, **30** and **40** are connected to the sync motor **50** and caused to rotate counterclockwise. Positioned in close proximity to the outer periphery of each cam is a single-pole, double-throw switch SW–**1**, SW–**2**, SW–**3** and SW–**4**. The swinger of each switch abuts the outer periphery of its corresponding cam so as to constitute a cam and follower unit. Cam **10** comprises

a circular portion 15 and raised portions 12 and 13. The camming surfaces 12 and 13 are 15° in arcuate length and are separated by a 15° base line surface 14. The raised portion 12 begins at an angle 20° from the vertical and ends at an angle 35° from the vertical, and the raised portion 13 begins at an angle 50° from the vertical and ends at an angle 65° from the vertical. The switch SW–1 includes a swinger or follower 16 and two stationary contacts 17 and 18. When the swinger 16 is on the upper surface of either portion 12 or 13 of cam 10, the swinger will be in the position shown by the dotted line. The contact 18 of switch SW–1 is connected to terminal G of plug TS–1 and swinger 16 of switch SW–1 is connected to terminal H of plug TS–1. Contact 17 is a floating contact and merely restricts the movement of swinger 16 as it follows the cam 10. The operation of cam 10 and switch SW–1 will be discussed more fully hereinbelow.

Cam 20 comprises a circular portion 24 and a raised portion 22. The raised portion 22 begins at an angle of 65° from the vertical and ends at an angle of 110° from the vertical. Switch SW–2 includes a swinger or follower 26 and stationary contacts 27 and 28. When swinger 26 is on the upper surface of raised portion 22 of cam 20, it moves to the position shown by the dotted line. Swinger 26 is connected to primary 90 of audio output transformer T–2 and contact 27 is connected to the B— terminal 61. Contact 28 is a floating contact and merely restricts the movement of swinger 26.

Cam 30 comprises a circular portion 34 and a raised portion 32. The raised portion 32 begins at an angle of 110° from the vertical and ends at an angle of 260° from the vertical. The switch SW–3 includes a swinger or a follower 36 and stationary contacts 37 and 38. Swinger 36 is connected to terminal F of plug TS–1, and contact 37 is connected to terminal E of plug TS–1. Contact 38 is a floating contact and merely restricts the movement of swinger 36.

Cam 40 comprises a circular portion 44 and a raised portion 42. The raised portion 42 begins at the vertical and ends at an angle of 10° from the vertical. Switch SW–4 includes a swinger or follower 46 and stationary contacts 47 and 48. Swinger 46 is connected to terminal C of plug TS–1 and contact 48 is connected to contact 94 of energizing relay K–1 and to terminal 43 of sync-motor 50. Contact 47 is a floating contact and merely restricts the movement of swinger 46. The terminal 41 of motor 50 is connected to terminal D of plug TS–1 and terminal 43 of motor 50 is connected to terminal C of plug TS–1 through Start switch SW–5. Start switch SW–5 is a single-pole, single-throw switch having a swinger 45.

Referring now to the upper right-hand portion of FIGURE 2, the energizing relay K–1 comprises an energizing coil 98 and contacts 94 and 96. The energizing coil 98 has its upper end connected to terminal A of plug TS–1 and its lower end connected to terminal B of plug TS–1. Contact 96 of relay K–1 is connected to terminal C of plug TS–1 and contact 94 of relay K–1 is connected to terminal 43 of motor 50.

Referring now to the middle portion of FIGURE 2, a conventional transistor oscillator is shown which comprises a transistor TR–2 having a collector 70, an emitter 72 and a base 74. The output of the conventional transistor oscillator is developed across output load resistor 86 and is capacitively coupled to transistor amplifier TR–3 through capacitor 88. The capacitor 88 has one end connected to the slider of potentiometer 86 and the other end connected to the base 84 of transistor TR–3. The amplified output of transistor TR–3 is developed across the primary 90 of output transformer T–2. The transistor oscillator TR–2 and the transistor amplifier TR–3 are conventional and a specific and detailed description of the operation thereof is not considered necessary since the oscillator may be any oscillator capable of generating a desired frequency and the amplifier may be any amplifier capable of amplifying that frequency. The operating potentials for the transistors TR–2 and TR–3 are delivered from the B— terminal 61 through contact 27 and swinger 26 to the terminals 81 and 91. Thus, it can be seen that the transistors TR–2 and TR–3 are normally non-conductive and are rendered conductive whenever cam 20 moves swinger 26 into the position shown by the dotted line.

Referring now to the middle right-hand portion of FIGURE 2, audio output transformer T–2 comprises a primary 90 and a secondary 92. Primary 90 is connected between the collector 80 of transistor TR–3 and the terminal 91. Secondary 92 has its upper end connected to terminal I of plug TS–1 and its lower end connected to terminal J of plug TS–1. In the illustration shown in FIGURE 2, the frequency of the transistor oscillator is shown as being 1,000 cycles per second which is amplified by transistor amplifier TR–3 and coupled by audio output transformer T–2 to terminals I and J of plug TS–1. That is to say, a 1,000-cycle per second signal will be available across the terminals I and J of plug TS–1.

Referring again to the upper right-hand portion of FIGURE 2, the multi-terminal plug TS–1 has a plurality of terminals A to L which are adapted to be plugged into the broadcast station transmitter. Terminals A and B are connected to any conventional remote energizing circuit, for example, switching means adapted to be remotely actuated for applying a negative voltage to the energizing coil 98 of relay K–1. Terminals C and D are connected to a conventional 110-volt, 60-cycle alternating current power supply. Terminals E and F are connected to a visual indicator such as a light or the like. Terminals G and H are connected to the transmitter radio frequency oscillator stage so that the RF frequency of the transmitter may be interrupted or disconnected by the switch SW–1 when swinger 16 thereof is engaging contact 17. Terminals I and J are connected to the transmitter mixer stage so that the 1,000-cycle output from audio output transformer T–2 may be superimposed upon or caused to modulate the RF frequency of the transmitter. Terminal K is the B— supply terminal which may have utility and use in the transmitter itself. Terminal L is connected to the transmitter ground.

Cycle of Operation

Assuming that the synchronous motor 50 is deenergized, the transistor oscillator TR–2 and the transistor amplifier TR–3 are normally non-conducting, and cams 10, 20, 30 and 40, switches SW–1, SW–2, SW–3, SW–4 and SW–5 and relay K–1 are in the position as shown in FIGURE 2. Accordingly, the local broadcast station transmitter is broadcasting in a normal manner.

A cycle of operation of the apparatus of the present invention may be commenced by either closing the Start switch SW–5 or remotely energizing the relay K–1 through terminals A and B of the plug TS–1. If start switch SW–5 is manually closed by an employee of the broadcast station, energizing voltage is applied to the motor 50 through the circuit path including terminal 43, lead 107, switch SW–5, lead 109, terminal C, terminal D, lead 111, lead 113 and terminal 41. Alternatively, energizing voltage may be applied to the motor 50 by remote energization of relay K–1. That is to say, when coil 98 of relay K–1 is energized, the contacts 94—96 are caused to close and the energizing voltage is applied through the circuit comprising terminal 43, lead 115, contacts 94 and 96, lead 117, terminal C, terminal D, lead 111, lead 113 and terminal 41.

When synchronous motor 50 is energized, it causes cams 10, 20, 30 and 40 to rotate counterclockwise. When the portion 12 of cam 10 causes swinger 16 to engage contact 17 of switch SW–1, the RF frequency developed by the transmitter (not shown) is disconnected since the RF frequency of the transmitter travels the circuit path including terminal G, lead 119, contact 18, swinger 16, lead 121 and terminal H. The angular distance of por-

tion 12 of cam 10 is 15° and the angular speed of cam 10 is predetermined to the extent that swinger 16 will be caused to engage contact 17 of switch SW–1 for a five-second interval. Thus, when swinger 16 is engaged by portion 12 of cam 10, the RF frequency or carrier frequency of the transmitter is not transmitted for a five-second interval. After this five-second interval, the swinger 16 engages the base line 14 of cam 10 and the swinger 16 engages contact 18 of switch SW–1. Thus, the carrier frequency is again connected in the transmitter for normal transmission. The angular distance of portion 14 is 15° and the relationship between this distance and the angular speed of cam 10 permits transmission of the carrier frequency for a second five-second interval. Thus, the carrier frequency will be transmitted for an interval of five seconds. When the swinger 16 engages the portion 13 of cam 10, the swinger is again caused to engage contact 17 of switch SW–1. The angular distance of portion 13 is 15° and the relationship of that distance and the angular speed of cam 10 again holds swinger 16 in engagement with contact 17 for a third five-second interval. Thus, the carrier frequency is again disconnected and prevented from being transmitted during this third five-second interval. When the swinger 16 engages the portion 15 of cam 10, the swinger 16 engages contact 18 and the carrier frequency of the transmitter is again normally transmitted.

Accordingly, it will be seen that cam 10 as it rotates through an angle of 65°, will cause the carrier frequency of the transmitter to be intermittently connected and disconnected within the transmitter, thereby resulting in a first and second five-second interval of non-transmission of the carrier frequency separated by a five-second interval of transmission of the carrier frequency. It will be recalled that this connection and disconnection of carrier frequency is pursuant to and in accordance with the first three five-second intervals of the above-mentioned Conelrad signal code.

Referring now to cam 20, after the motor 50 has caused the cams to move an angle of 65°, the portion 22 of cam 20 will engage swinger 26 of switch SW–2 and cause swinger 26 to engage contact 27 of switch SW–2. When swinger 26 engages contact 27, the B— potential available at terminal 61 is connected to terminals 81 and 91 for the purpose of providing energizing voltages for transistors TR–2 and TR–3, respectively, through the circuit path including B— terminal 61, lead 123, contact 27, swinger 26, lead 125, terminal 81 and terminal 91. The angular distance of raised portion 22 of cam 20 is 45° and the relationship between this angular distance and the angular speed of cam 20 is such that swinger 26 is caused to engage contact 27 for a 15-second interval. Thus, the oscillations developed by transistor oscillator TR–2 and amplified in transistor amplifier TR–3 are coupled across audio output transformer T–2 to terminals I and J of plug TS–1 to the mixer stage of the transmitter. Therefore, during this 15-second interval, when portion 22 engages swinger 26, the 1,000-cycle frequency coupled to the mixer stage of the transistor will modulate the carrier frequency and be transmitted by the transmitter. It will be recalled that this 15-second interval is pursuant to and in accordance with the fourth interval of the above-mentioned Conelrad signal code.

Referring now to cam 30, when the motor 50 has moved the cams an angular distance of 110°, the portion 32 of cam 30 engages swinger 36 of switch SW–3. When swinger 36 is engaged by portion 32, the swinger 36 is caused to engage contact 37 of switch SW–3, thereby closing the visual indicator circuit. The visual indicator circuit, including a suitable power source, is connected to terminals E and F of plug TS–1 and the cam 30 closes this circuit through the series path including terminal E, lead 127, contact 37, swinger 36, lead 129 and terminal F. The angular distance of portion 32 of cam 30 is 150° beginning at an angle 110° from the vertical and ending at an angle 260° from the vertical, therefore holding swinger 36 in engagement with contact 37 for an interval of approximately 50 seconds. When the swinger 36 engages the portion 32 of cam 30, a visual indicator, such as a light, will be energized so as to notify an employee of the broadcast station that audio modulation of the carrier with instructions and information pertaining to the national emergency can commence or a device having a prerecording of instructions and information pertaining to a national emergency may be energized by the movement of swinger 36 in engagement with contact 37. In any event, whether an employee audio modulates the carrier wave or whether a device having a prerecording modulates the carrier wave, the audio signals are delivered to the mixer stage of the transmitter in the normal broadcast manner for modulation and transmission to the general public.

Referring to cam 40, when the motor 50 has moved the cam so that raised portion 42 of cam 40 is engaging swinger 46 of switch SW–4, swinger 46 is caused to engage contact 47 of switch SW–4. Thus the energizing voltage for motor 50 is disconnected and the motor caused to stop. It will be recalled that a cycle of operation of the apparatus of the present invention was commenced by either the manual closing of Start switch SW–5 or by remote energization of relay K–1. It should be noted that the closure of switch SW–5 or the energization of relay K–1 need only be for a period sufficient to cause portion 42 of cam 40 to be moved out of engagement with swinger 46 of switch SW–4. The angular distance of portion 42 of cam 40 is 10° and the relationship of that distance to the angular speed of cam 40 merely requires that switch SW–5 or relay K–1 be actuated or energized, respectively, for a period not exceeding five seconds whereby swinger 46 will be in engagement with portion 44 of cam 40 and caused to engage contact 48 of switch SW–4 thereby delivering energization voltage to motor 50 through the circuit path including terminal C, lead 109, swinger 46, contact 48, lead 131, lead 107, terminal 43, terminal 41, lead 113, lead 111 and terminal D. Therefore, once switch SW–5 or relay K–1 is actuated or energized, respectively, the motor 50 is locked into an energized condition for at least one revolution of cam 40 or a period of approximately 115 seconds, at which time the portion 42 of cam 40 will engage swinger 46 and disconnect the energizing voltage from the motor 50. The apparatus of the present invention will then be in readiness for a subsequent cycle of operation.

It will therefore be noted that the apparatus of the present invention controls the standard broadcast station transmitter so that it will first transmit the carrier frequency of the transmitter for a five-second interval, disconnect transmission of the carrier for a five-second interval, transmit carrier frequency for a five-second interval, transmit carrier frequency modulated with a 1,000-cycle signal for a 15-second interval and transmit carrier frequency audio modulated with instructions and information pertaining to the national emergency for an indefinite period limited only by the shut-down of the transmitter itself. Further, at the completion of the 15-second interval wherein carrier frequency is modulated with a 1,000-cycle signal, a visual indicator is energized for the purpose of notifying the operator of the device that audio modulation of the carrier frequency with instructions and information may commence. Finally, the control unit is deenergized and returned to a condition in readiness for any subsequent cycle of operation.

It will be apparent from the foregoing that the device of the present invention is low in cost, rugged in construction and requires very little maintenance. The use of energizing relay K–1 provides a feature whereby the device may be remotely controlled, thereby eliminating the necessity that an employee of a standard broadcast station be available to commence a cycle of operation

of the device. Further, the use of transistors in the oscillator and amplifying portions, as well as the rectifying portion, provides reliability, accuracy and efficiency.

It is further apparent from the above that the present invention provides a simple and inexpensive standard broadcast station transmitter control device capable of controlling the transmitter so that a signal code similar to the Conelrad signal code may be transmitted automatically. Further, the control system of the present invention is operative both day and night notwithstanding the operativeness of the broadcast station transmitter since operating potentials for the transmitter are available at terminal K of plug TS–1. Therefore, whenever it is desirable or necessary to transmit the Conelrad signal code, the control device of the present invention may be remotely energized so as to automatically broadcast the Conelrad signal code for the purpose of warning the general public of an impending and imminent national emergency. Although the device of the present invention may be remotely controlled, it may also be energized by the manual actuation of Start switch SW–5 by an employee of the broadcast station.

From the foregoing, it will be seen that the present invention is uniquely adapted to obtain all of the ends and objects hereinbefore set forth, together with other advantages which are obvious and which are inherent in the device.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the appended claims.

It is to be further understood that the control device of the present invention may be readily modified so as to be adapted to control the transmission of any warning signal code which may be adopted by governmental authorities for the purpose of notifying the populace of an imminent and impending emergency without departing from the scope of the invention. Accordingly, the hereinabove described Conelrad signal code system is merely exemplary of one of the presently adopted Civil Defense systems to which the device of the present invention is capable of producing and should not be construed as restricting or limiting. By way of example, the device of the present invention may be modified to produce a signal code for a system which utilizes power transmission lines or telephone lines as the means for linking the signal between the transmitter and the receiver. A system of the latter type has been adopted by Civil Defense authorities and is commonly referred to as the Near warning system. Thus, a modification of the device of the present invention so as to produce the Near signal code is clearly contemplated and requires only minor circuit changes.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. An emergency warning system for audibly informing the general public of an impending national emergency comprising: a transmitter for transmitting signals; a receiver being responsive to said signals; and a control unit connected to said transmitter for sequentially disabling said transmitter in accordance with a predetermined signal code and for modulating said signals during a predetermined interval of said signal code; said control unit including a frequency developing means, at least two switches, one for sequentially disabling said transmitter in accordance with said signal code and another for coupling the output of said frequency developing means to said transmitter during said predetermined interval of said signal code; said signal code comprising two five second intervals of non-transmission of said signals separated by a five second interval of transmission of said signals and followed by a fifteen second interval of transmission of said signals modulated with the output of said frequency developing means and wherein said control unit further includes a visual indicator with said indicator being actuated at the end of said fifteen second interval of said signal code by said control unit, and means for momentarily energizing said control unit either locally or remotely, said receiver developing and reproducing the modulation of said signals when transmitted in accordance with said signal code for audibly informing the general public of an impending national emergency.

2. An emergency warning system for informing the populace of an impending national emergency comprising: a control device for developing a predetermined signal code; a transmitter connected to said control device for transmitting a predetermined carrier wave; a receiver for developing and reproducing said carrier when transmitted by said transmitter; said control device including a plurality of switches and an oscillator, a first switch being connected to said transmitter for intermittently interrupting the transmission of said carrier in accordance with said signal code; a second switch being connected to said oscillator and coupling the output of said oscillator to said transmitter for modulating said carrier during a predetermined interval of said signal code, said control device further including switch actuating cam means and cam drive means; said drive means driving said cam means at a predetermined rate, said cam means intermittently actuating said first switch in accordance with said signal code for intermittently interrupting the transmission of said carrier and actuating said second switch during said predetermined interval of said signal code for coupling the output of said oscillator to said transmitter and means for momentarily energizing said drive means either locally or remotely, and said control device further including a third and a fourth switch, a light and an energizing voltage; said third switch, when actuated, causing said light to be energized; said cam means actuating said third switch at the end of said predetermined interval of said signal code thereby energizing said light for visually indicating the end of said signal code; said fourth switch, when actuated, ensuring the application of said energizing voltage to said drive means for a predetermined period, and said cam means actuating said fourth switch at the beginning of said signal code thereby ensuring energization of said drive means for said predetermined period, and de-actuating said fourth switch at the end of said predetermined period thereby de-energizing said drive means whereby said control device is rendered in readiness for a subsequent cycle of operation, and said receiver being responsive to said carrier when transmitted with said signal code to develop and reproduce the output of said oscillator for informing the populace of an impending national emergency.

3. An emergency warning system in accordance with claim 2 wherein: said signal code comprises predetermined intervals of non-transmission of said carrier separated by predetermined intervals of transmission of said carrier and followed by a predetermined interval of said carrier modulated with the output of said oscillator; and said predetermined period is at least longer than the summation of said intervals of said signal code.

4. An emergency warning system in accordance with claim 2 wherein: said signal code comprises two five second intervals of non-transmission of said carrier separated by a five second interval of transmission of said carrier and followed by a fifteen second interval of transmission of said carrier modulated with the output of said oscillator; and said predetermined period is at least longer than thirty seconds.

5. A control device for controlling the transmission of a carrier wave by a transmitter in accordance with a predetermined signal code comprising: first and second switches; switch actuating cam means; drive means connected to said cam means for driving said cam means at a predetermined rate; means connected to said drive means for energizing said drive means either locally or remotely; an oscillator for developing a predetermined frequency; said first switch being connected to said transmitter and intermittently disabling said transmitter when actuated for interrupting the transmission of said carrier in accordance with said signal code; said second switch being connected to said oscillator and coupling said frequency to said transmitter when actuated for modulating said carrier during a predetermined interval of said signal code; said cam means actuating said first switch in accordance with said signal code and actuating said second switch during said predetermined interval of said signal code whereby said transmitter is controlled so as to transmit said carrier in accordance with said signal code and modulate said carrier with said frequency during said predetermined interval of said signal code, said control device further including a third and a fourth switch, a light, and an energizing voltage; means connected between said driving means and said energizing voltage for initially energizing said drive means; said third switch being connected to said light and energizing said light when actuated by said cam means for providing a visual indication of the end of said signal code; said fourth switch being connected between said drive means and said energizing voltage and supplying said energizing voltage to said drive means when actuated by said cam means for ensuring continued energization of said drive means for a predetermined period; and said cam means actuating said third switch at the end of said predetermined interval of said signal code, actuating said fourth switch at the beginning of said signal code and de-actuating said fourth switch at the end of said predetermined period whereby said drive means being energized during said predetermined period thereby ensuring a complete cycle of operation of said control device.

6. A control device in accordance with claim 5 wherein said means for energizing said drive means includes: a single pole single throw switch for locally energizing said drive means until said fourth switch is actuated; and a relay actuated switch for remotely energizing said drive means until said fourth switch is actuated.

7. A control device in accordance with claim 5 whereby said signal code comprises a first and second five second interval of non-transmission of said carrier separated by a five second interval of transmission of said carrier followed by a fifteen second interval of transmission of said carrier modulated with said frequency and said predetermined period is at least longer than thirty seconds.

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PRODUCT REVIEW

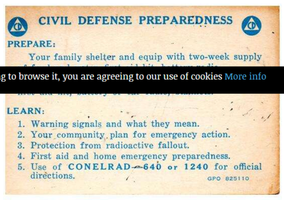
CONELRAD

JULY 2, 2015
BY JOHN DUNN

COMMENTS 2

Print PDF Email

I came across this card the other day. It dates from the mid-1950s era, from a time when there was much concern about the possibilities of enemy military attack and a requirement for radio silence in case of such an event.



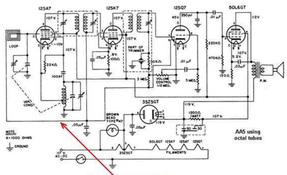
Two AM radio frequencies were assigned for anticipated broadcasts of emergency information, one at 640 kHz and the other at 1240 kHz. Those frequencies were often written out as 640 kc and 1240 kc in the notational convention of the day.

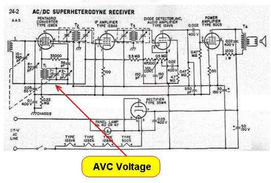
It was required of amateur radio operators that they go to radio silence in the event of a CONELRAD alert. To that end, Heathkit offered a "CONELRAD Alarm", their model CA-1.

Please see the HeathKit Virtual Museum at: http://www.heathkit-museum.com/ham/hvmca-1.shtml

The CA-1 was supposed to be hooked into an AM radio's AVC (automatic volume control) so that if an AM radio station being monitored by that radio were to go off the air, there would be a shift of the AVC voltage that would be detected by the CA-1 and the amateur radio transmitter would be put off the air at the same time.

That AVC voltage would typically come from the dual diode detector of the radio's 12SQ7, 12AT6 or 12AV6 vacuum tube. Physically finding the node with that particular voltage could be a bit tricky in some radios, especially those with circuit boards.





It is worth noting too that since most AM radios at the time were of AC/DC design, that this kind of hookup constituted a very dangerous situation from the standpoint of electrical shock hazard.

Please see:

Lethal Hazards of AC-DC Radios and Televisions

There is a very nicely written essay about CONELRAD on Wikipedia. I recommend reading it.

2 COMMENTS ON "CONELRAD"

bdcst
July 7, 2015

"AVC or AGC? One assumes controlling radio audio volume, which an automatic RF gain control would do for AM radio. But AGC might be the more accurate term as applied to an AM receiver just as AFC was used to eliminate FM receiver frequency drift with tem

↳Log in to Reply

John Dunn
July 7, 2015

""AVC" in the parlance of the time stood for "Automatic Volume Control". Today, we would use "AGC" as in "Automatic gain Control", "AFC" as in "Automatic Frequency Control", "ALC" as in "Automatic Level Control" and perhaps some other nomen

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ABSTRACT

WE MUST BE READY FOR A NEW DANGER: OPERATION ALERT, CONELRAD, AND CIVIL DEFENSE IN THE EARLY COLD WAR

In the 1950s, the United States government turned towards civil defense in order to prepare its citizens for the possibility of nuclear war. During the Eisenhower administration, from 1952 to 1960, civil defense was designed to fit into certain difficult criteria. Civil defense needed to have a military purpose of protecting the public and a social purpose of reassurance that there were measures in place. However, this had to be accomplished with a relatively small budget. By examining two of the civil defense programs that were implemented in this time period, Operation Alert and Conelrad, it is possible to create a better understanding of civil defense as a whole during this period of the early Cold War. This thesis explores the growth of these programs during the Eisenhower administration, showing how the lack of budget necessitated evacuation and information based civil defense rather than shelters. It also shows the faults in these programs, explaining why they were replaced during the Kennedy administration.

Lukas William Janzen
December 2017

WE MUST BE READY FOR A NEW DANGER: OPERATION ALERT, CONELRAD, AND CIVIL DEFENSE IN THE EARLY COLD WAR

by

Lukas William Janzen

A thesis

submitted in partial

fulfillment of the requirements for the degree of

Master of Arts in History

in the College of Social Sciences

California State University, Fresno

December 2017

APPROVED

For the Department of History:

We, the undersigned, certify that the thesis of the following student meets the required standards of scholarship, format, and style of the university and the student's graduate degree program for the awarding of the master's degree.

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Thank you to my thesis committee, especially Dr. Lori Clune, for providing me with all of the guidance and understanding that I desperately needed.

Finally, thank you to my mom and dad. Dad, thank you for the constant encouragement when I chose to continue to pursue history, when a sane person should not. Mom, almost exactly six years later, I'm sure you would have been very proud of this.

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INTRODUCTION

There is a newsreel that begins with the crash of a gong and footage of the explosion of an atomic bomb. A title card comes into view over the mushroom cloud, reading "US Takes Cover: Operation Alert!" The sounds of an orchestra are quickly muffled by the scream of a siren and the footage shifts as an announcer begins to rapidly narrate the scene. However, despite the bombastic opening, the next scenes depict President Eisenhower leisurely strolling to a limousine while checking his watch. They also show New York City in a barren state as evacuations keep everyone indoors, shots of thousands of government employees evacuating, and a shot of "Old Glory" flying above a tent city that served as a base of operations for the event. The film reel bookends with another shot of an atomic blast, and the words "five million dead, ten million injured, from an atomic attack all Americans hope and pray will never be real."[1]

While this news footage never aired, the takeaways from it are clear: first, the very real threat of an atomic attack, which was emphasized twice by footage of atomic blasts in the introduction and closing of the film; second, everyone from the common man in New York to the president himself participated in the drill, with everyone doing what they could in the exercise. Finally, it is clear from his slow walk and a bored demeanor that President Eisenhower thinks relatively little of the event. What isn't said is why this event was taking place at all.

The event in question was Operation Alert, which was one of the many civil defense programs the federal government developed in the 1950s. Civil defense took on a new meaning during this time. While previously it was meant to

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1 "USA Operation Alert - Nation Wide Air Raid Drill AKA Operation 'Alert' (1955)." *YouTube*, YouTube, 13 Apr. 2014, www.youtube.com/watch?v=X_f2al0WMTU.

prepare civilian population centers for attacks in wartime, it was now being used as a means to protect against a sudden declaration of war and a subsequent nuclear strike. Most of the public knowledge of civil defense came from the many news films that permeated popular culture, such as the famous “Bert the Turtle” who taught kids to duck and cover to protect themselves from an atomic bomb, or the yellow and black fallout shelter signs that were present in most cities. However, there were multitudes of civil defense programs during the 1950s that follow a similar structure.

By examining two individual civil defense programs with vastly different purposes, it is possible to understand the criteria for civil defense programs in this time. Operation Alert was a nationwide event that functioned as a day of evacuation and drilling in preparation for a nuclear attack. Conelrad (short for CONtrol of ELectromagnetic RADiation) served as a precursor to the Emergency Broadcast System, and was designed with the purpose of confusing the navigations of enemy aircraft. Despite their differences in purpose, both of these civil defense programs were in place for nearly a decade, and both ended around the same time.

From these two programs, we can discern how civil defense programs in this time period were deemed successful. First, they had to have a military purpose meant to preserve the population and act as deterrent against an enemy attack. A common rationale was if America was prepared for an attack and was able to limit the casualties from a nuclear blast, the strategic value of the attack would be lessened. Second, these programs had a social purpose designed to keep the public informed and aware that there was a plan in place. While many plans were drafted that could have fulfilled these goals far better than Operation Alert or Conelrad, at least according to the Federal Civil Defense Administration (FCDA), these two

programs were able to succeed because of a limiting factor placed on civil defense at the time: budget. This is the third aspect to civil defense that started in this time, since the Eisenhower administration provided limited funding for civil defense. Operation Alert and Conelrad demonstrate how civil defense programs flourished only when they fulfilled both the social and military goals, while simultaneously were inexpensive to manage.

Historiography

Since civil defense is a smaller part of Cold War history, it is necessary to place historians' works on civil defense in a larger context of the Cold War. This means that before the historiography of civil defense can be properly examined, it is first necessary to detail the larger historiography of the Cold War environment that civil defense grew from, and examine why civil defense became an issue. To do this, we must first show how historians have framed the early escalation of the Cold War in the late 1940s, before moving to examine how historians have portrayed Eisenhower's administration, as his use of propaganda provides insight into how his administration approached civil defense. From there, we can build a clearer view of the historiography of civil defense.

On August 29, 1949, in the desert of Kazakhstan, the Soviet Union completed its first successful test of a nuclear bomb and ignited the need for civil defense in America. Historian John Lewis Gaddis describes this event in *The Cold War: A New History*, which serves as a predominant text for understanding how the Cold War developed.[2] Gaddis states that this does not indicate the beginning of the Cold War, but instead marks the beginning of the nuclear arms race that becomes key to the changes that occur to civil defense. Gaddis notes that

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[2] John Lewis Gaddis, *The Cold War: A New History* (New York City: Penguin Press, 2005), xi.

following the Soviet detonation, Truman drastically increased the production of existing atomic bomb models and ordered development of the so called "super-bomb," or the hydrogen bomb.[3] Paul Boyer, in *By the Bomb's Early Light: American Thought and Culture at the Dawn of the Atomic Age*, focuses on public perception of the atomic bomb. Boyer attempts to go into the psyche of the average American, which he notes goes through a cyclical pattern of action and fear of the atomic bomb followed by periods of apathy.[4] Regarding the Soviet nuclear test, Boyer notes that four years of the public knowing that America's nuclear monopoly would be short left the public apathetic.

While bigger bombs were one tactic that Truman approved, he also called for a total evaluation of the United States armed forces. This resulted in a document titled NSC-68, for National Security Council report 68, which decreed that the United States was not prepared for the Soviet Union's rapid development and expansionist goals. David S. Painter's *The Cold War: An International History* and Campbell Craig and Fredrik Logevall's *America's Cold War: The Politics of Insecurity* both provide detailed views on how the NSC developed this important document and how it was received. Craig and Logevall focus more on the policies that stemmed from the document.[5] According to Craig and Logevall, the militarization following NSC-68 developed a deterrence for the Soviet Union and meant to serve as an example that the Soviet Union could not get away with rapid expansion in Europe.[6] In contrast, Painter provides a view of the Soviet

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3 Gaddis, *The Cold War*, 35.

4 Paul Boyer, *By the Bomb's Early Light: American Thought and Culture at the Dawn of the Atomic Age* (Chapel Hill: University of North Carolina Press, 1994), x.

5 Campbell Craig and Fredrik Logevall, *America's Cold War: The Politics of Insecurity* (Cambridge: Harvard University Press, 2009), 110-114.

6 Craig and Logevall, *America's Cold War*, 112.

response to NSC-68. Painter notes that the Soviet response to NSC-68 helped push the United States in their decision to aid South Korea, ultimately leading to their involvement in the Korean War two months later.[7]

Historiography of the Korean War is vast and mostly unrelated to the larger themes of this work, but two texts provide unique insight that show how the war helped shape policy for the remainder of the 1950s. The first of these is Masuda Hajimu's *Cold War Crucible: The Korean Conflict and the Postwar World*. This is a recent text that defies many of the previous historiographical norms held regarding the Korean War and the Cold War at large. Masuda argues that the Cold War was constructed by ordinary people in the U.S. and the Western world as a means to accomplish their motives, mostly to punish non-conforming groups. According to Masuda, this came to a head in the Korean War, as it provided a tangible threat across every nation involved, and opposing the status quo meant opposing the war. Masuda sums this up by writing "'Unity'— domestic tranquility— was the goal in itself, and fighting communism was the means of achieving unity of the population."[8] Masuda's approach deals little with the war itself or the policies that stemmed from it, but it serves as a strong example of how perception has changed regarding the Korean War and the years of the early Cold War.

The second text regarding the Korean War is Steven Casey's *Selling the Korean War: Propaganda, Politics, and Public Opinion in the United States, 1950-1953*. Casey provides a look into what is referred to as a forgotten war, and how the U.S. government developed widespread propaganda meant to influence

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[7] David S. Painter, *The Cold War: An International History* (New York: Routledge, 1999), 28-30.

[8] Masuda Hajimu, *Cold War Crucible: The Korean Conflict and the Postwar World* (Cambridge: Harvard University Press, 2015), 276.

the public into supporting the war. The text is a comprehensive and detailed examination of the American reception to the Korean War and key events such as China's involvement and the firing of Douglas MacArthur. Casey's greatest contribution is showing how Truman's propaganda worked domestically. Casey writes that an important development during this time was that the political climate of the United States was made right to develop civil defense programs, since they needed a way to reassure the public that the policy of deterrence was the correct one.[9] Casey's two conclusions are also of key importance to the historiography. The first was that domestic propaganda took on a drastic new role during the Korean War. Most other texts of the time period focus on the international propaganda meant to sway indecisive nations towards the United States.[10] Casey instead shows that similar propaganda was being used to deliberately influence the American public, which introduces a notion of domestic propaganda that continues throughout historical works on civil defense. Secondly, Casey argues that the failings of this propaganda and the depletion of American interest in the war directly resulted in the election of Dwight Eisenhower in 1952.[11]

The transition from Truman to Eisenhower is covered by Laura A. Belmonte in *Selling the American Way: U.S. Propaganda and the Cold War.* Belmonte uses a similar approach to Casey, and is able to create a basic

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9 Steven Casey, *Selling the Korean War: Propaganda, Politics, and Public Opinion in the United States, 1950-1953* (New York: Oxford University Press, 2008), 106.

10 For more information on how the United States used propaganda during this time see *America's Weapons of Psychological Warfare* (New York: H.W. Wilson Company, 1951) edited by Robert E. Summers, which provides clear descriptions of information programs and other propaganda used in foreign policy up until its publication in 1951.

11 Casey, *Selling the Korean War*, 5.

supplement to the great detail he provided regarding the Truman administration's use of propaganda. Belmonte argues that while Truman had left an information program that did not function as properly as it should, "psychological warfare had emerged as a legitimate and important element of U.S. foreign policy."[12] Throughout her depiction of the Eisenhower administration, Belmonte argues that the U.S. acted differently than the propaganda and rhetoric it presented, hurting its effectiveness domestically. This is apparent through the acts of Senator Joseph McCarthy, whose vitriolic anti-communist attacks even targeted state propaganda such as the frequent Voice of America broadcasts meant to reassure the public, or the promotion of "Atoms for Peace" while simultaneously increasing the nuclear stockpile.[13] However, despite the issues with the domestic propaganda, Belmonte states that international propaganda was typically consistent regardless of which political group presented it. This provided a positive representation of what was desired as a means to promote the American way of life.

The effective use of propaganda in foreign policy was Eisenhower's response to the policy of containment created after NSC-68. According to John W. Mason, in *The Cold War: 1945-1991*, Eisenhower's approach to changing conditions in Asia were different from Truman's approach to containment "in appearance only."[14] This is examined in more detail in the collection edited by Kathryn C. Statler and Andrew L. Johns titled *The Eisenhower Administration, the Third World, and the Globalization of the Cold War*. This volume examines the massive involvement that Eisenhower had throughout the world, and argues that

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12 Laura A. Belmonte, *Selling the American Way: U.S. Propaganda and the Cold War* (Philadelphia: University of Pennsylvania Press, 2008), 48.

13 Belmonte, *Selling the American Way*, 52-63.

14 John W. Mason, *The Cold War: 1945-1991* (New York: Rutledge, 1996), 24.

since Eisenhower's administration struggled throughout the Third World, it had great difficulty dealing with anything other than an overt Soviet military threat.[15] This historiographical depiction of propaganda and containment shows how historians often viewed the Eisenhower administration as unable to accomplish its foreign and domestic goals without the use of propaganda.

Eisenhower's use of propaganda is best explained in Kenneth Osgood's *Total Cold War: Eisenhower's Secret Propaganda Battle at Home and Abroad*. Osgood argues that Eisenhower intended to use propaganda as a major weapon in order to decisively win the Cold War, rather than simply achieve détente as other historians have argued.[16] Osgood mostly focuses on Eisenhower's international propaganda, but still presents evidence to show that Eisenhower was hands on with propaganda of all forms. This is best exemplified by Osgood's chapter on Atoms for Peace and Operation Candor, which feature Eisenhower speaking to Americans in an attempt to alleviate fears concerning the newly created hydrogen bomb. Osgood writes that this was accomplished because Eisenhower took advantage of a greater range of radio and television broadcasts that his predecessors could not.[17]

This context of propaganda and the events of the Cold War from 1949 until 1960 are important as they provide a common groundwork that the historiography of civil defense is built upon. As previously mentioned, the Eisenhower administration made extensive use of propaganda in domestic and foreign policy,

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[15] Kathryn C. Statler and Andrew L. Johns, eds., *The Eisenhower Administration, the Third World, and the Globalization of the Cold War* (Lanham: Rowman & Littlefield, 2006), 272.

[16] Kenneth Osgood, Total Cold War: Eisenhower's Secret Propaganda Battle at Home and Abroad (Lawrence: University Press of Kansas, 2006), 6-7.

[17] Osgood, *Total Cold War,* 153-159.

and civil defense policy under the Eisenhower administration was no different. As such, the historiography of civil defense from the 1950s has been focused on the use of civil defense as a means for Eisenhower's domestic propaganda. In addition, civil defense is rarely more than a chapter in a larger text, while monographs on civil defense tend to be short and mostly only reference previous texts on the same topic. This focus on propaganda and the lack of a groundbreaking, definitive text akin to *Total Cold War* or *Cold War Crucible* has resulted in a fairly unified historiography of civil defense.

This notion of civil defense as propaganda is prominent in Allan M. Winkler's *Life Under a Cloud: American Anxiety About the Atom*. While this text is meant to serve as a detailed look at the entirety of the Cold War, one of its chapters on the 1950s focuses on civil defense and Eisenhower's attempt to promote personal shelters. Winkler argues that despite the urgings of scientists and reports that showed a need for stronger civil defense in order for it to be effective, Eisenhower chose to promote personal shelters rather than national civil defense. This developed throughout the 1950s into a shelter culture in which protective shelters "became a part of the cultural landscape."[18] Winkler dedicates little of his chapter on civil defense to aspects outside of shelters, instead going into detail about the many articles written on developing and maintaining a proper shelter.

In Laura McEnany's *Civil Defense Begins at Home: Militarization Meets Everyday Life in the Fifties*, propaganda is supplemented by the growing militarization that the Eisenhower administration expected of the American

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[18] Allan M. Winkler, *Life Under a Cloud: American Anxiety about the Atom* (New York: Oxford University Press, 1993), 120.

population.[19] According to McEnany, civil defense was used to bring the Cold War into the household, noting that much of the rhetoric of civil defense was not limited by race or gender. Instead, it was "equal in suffering," with Congress and the FCDA showing that all Americans were equally able to save themselves, as they were all potential targets. Regarding women, McEnany wrote that civil defense gave them a clearly prescribed role to play in the domestic sphere, but it still served as a gateway to greater involvement.[20]

While there are scholars who do not claim that civil defense was purely propaganda, they often refer to it instead as a theatrical production. Tracy C. Davis in *Stages of Emergency: Cold War Nuclear Civil Defense* uses the language of theater to describe how civil defense was akin to a stage production, stating that "civil defense draws directly upon the traditions and techniques of the stage: Cold War nuclear civil defense is not like something that is theatrical but is an embodied mimetic methodology that is inherently and crucially theatrical."[21] Davis has a background in theater and performing arts rather than history, making this comparison seem fairly obvious. With this view of production and theater as her focus, Davis claims that civil defense involved ordinary people serving as actors rehearsing a script written by the government.

Guy Oakes also employs this theatrical view in *The Imaginary War: Civil Defense and American Cold War Culture*. Oakes states that civil defense served as an institutional system to promote determination in the public by presenting a

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19 Laura McEnany, *Civil Defense Begins at Home: Militarization Meets Everyday Life in the Fifties* (Princeton: Princeton University Press, 2000), 11.

20 McEnany, *Civil Defense Begins at Home*, 115-125.

21 Tracy C. Davis, *Stages of Emergency: Cold War Nuclear Civil Defense* (Durham: Duke University Press, 2007), 3.

nuclear attack as a limited disaster more akin to a hurricane than a full-scale holocaust.[22] While this is in line with other historiography regarding civil defense, *The Imaginary War* is notable for providing the seminal description of Operation Alert. Oakes refers to Operation Alert using the language of theater, referring to it as "an elaborate national sociodrama that combined elements of mobilization for war, disaster relief, the church social, summer camp, and the county fair."[23] This passage is nearly always used when referencing Operation Alert. However, Oakes' description of Operation Alert focuses very little on the details of its implementation. Instead, Operation Alert sets up how it was used in propaganda films and for the dissemination of information to the public.[24]

After Eisenhower's administration ended and Kennedy's began, the major change in civil defense came after the Cuban Missile Crisis in October, 1962. Alice L. George shows how American citizens prepared for the realistic threat of a nuclear attack in her monograph *Awaiting Armageddon: How Americans Faced the Cuban Missile Crisis.* While George focuses mostly on the psychological impact of the Cuban Missile Crisis during the incident, she does argue that civil defense had failed to make an impactful dent into the psyche of the public. George claims that bunkers were a part of the regular public mentality, but did not inspire confidence in the American population.[25] George also argues that after the Cuban Missile Crisis, the psyche of the American population had been permanently

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22 Guy Oakes, *The Imaginary War: Civil Defense and American Cold War Culture* (New York: Oxford University Press, 1994), 8.

23 Oakes, *The Imaginary War*, 84.

24 Oakes, *The Imaginary War*, 96.

25 Alice L. George, *Awaiting Armageddon: How Americans Faced the Cuban Missile Crisis* (Chapel Hill: University of North Carolina Press, 2003), 42.

changed. The bunker mentality Eisenhower promoted became irrelevant once put under real pressure, removing the interest for his method of civil defense.[26]

While civil defense historiography focuses on similar aspects of civil defense, with the added context of the Cold War and Eisenhower historiography, as well as the conclusion of the Cuban Missile Crisis, it is possible to show why civil defense tends to be depicted as propaganda. As has been shown, Eisenhower's response to the groundwork that Truman left was to develop propaganda to achieve the same goals that Truman's drastic increase in militarization accomplished. Since civil defense was never developed in an effective way, Eisenhower's use of it as propaganda has taken the focus in historiography. My research does not create a strong challenge to this historiography, but instead has a small addition. Civil defense was used as propaganda during the Eisenhower administration, though not for the same purpose of containment as his foreign policy. Instead, Eisenhower's disinterest in civil defense forced the FCDA into only producing propaganda and limited events, such as Operation Alert, because Eisenhower was unwilling to budget larger, more costly projects.

Since Operation Alert was the more publically known and widely implemented of the civil defense programs I examine, chapter 1 is dedicated to its creation, implementation, and reception. This chapter illustrates how Operation Alert was developed in lieu of proposed FCDA shelter programs, and shows the mixed reaction among the public and varying levels of support it received. Chapter 2 follows Conelrad, demonstrating its inception as a military program designed to

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[26] George, *Awaiting Armageddon*, 169. More detail on Kennedy's approach to policy before and after the Cuban Missile Crisis can be found in McGeorge Bundy's *Danger and Survival: Choices About the Bomb in the First Fifty Years* (New York: Random House, 1988). However, as McGeorge Bundy served as national security advisor for Kennedy and Johnson, his perspective is very much aligned with Kennedy's.

confuse enemy attacks, before transforming more fully into its purpose as a means to spread information. Chapter 3 uses the details from the previous two chapters to place Conelrad and Operation Alert into the greater context of civil defense in the early Cold War, and examines how even though the two differed in implementation and exact purpose, both are representative of civil defense in the 1950s. In exploring these elements I hope to prove how civil defense developed into a propaganda system because of its lack of federal funding and interest.

CHAPTER 1: OPERATION ALERT

After the first Soviet detonation of an atomic bomb in 1949, U.S. government officials had to face the possibility that they could become the target of a nuclear strike at any moment. While the U.S. military and elected officials had some strategies for dealing with conventional attacks, the thought of nuclear warfare was completely unprecedented in terms of planning and scope, with no real estimates of how to prevent an attack or determine the outcome of one. In the years of World War II, bombing shifted from strategic, precision strikes to indiscriminate attacks on civilian centers. This mentality, combined with the destructive power of an atomic bomb, created a new fear in America that any city could be destroyed in a single flash. In order to counter this possibility, President Truman developed the Federal Civil Defense Administration (FCDA) in 1950. He charged the agency with implementing programs that would provide American citizens with a means to survive a nuclear attack. The FCDA had both a military purpose in terms of deterring nuclear attacks and a social purpose of creating propaganda for the American public to reassure citizens of their safety. This chapter is primarily centered on Operation Alert, the first widespread evacuation drill that then occurred annually from 1954 until 1961, and examines how the military goals and social propaganda did not always coincide as well as the FCDA had hoped.

Prior to Operation Alert, the FCDA focused on creating a nationwide shelter program able to protect most of the public. FCDA administrator Millard Caldwell saw shelters as an ideal means of defense against a nuclear attack, as they would be able to provide safety for the millions of people who were in major cities and targets. Early studies predicted that more than 67 million Americans

resided in the major target areas, such as Chicago, New York, and Los Angeles, and that if an attack occurred during working hours 33 million of them would be stuck in traffic congestion and would not be able to leave the affected area. Of these 67 million, only 3 million could be sheltered after the first analysis in 1951, with another 17 million who could be sheltered if major modifications were made to existing buildings.[27] However, the major consequence of this plan was its cost.

Initially in 1951, the FCDA requested more than $250 million dollars in order to promote a multi-staged shelter program that would catalogue all the existing shelters, build new ones, and upgrade former shelters as needed. The FCDA projected that this would cost more than three billion dollars, an expenditure that Congress declared too expensive. In the first year, the FCDA only received about $37 million from the federal government, as the Truman administration and Congress both believed that the purpose of the FCDA was for planning, training, and guidance. Instead, state and local organizations were supposed to bear the major brunt of civil defense expenditures, and the funding that the FCDA received went mostly to emergency supplies for distribution through FCDA offices across America.[28] In addition, during the end of the Truman Administration the fear of nuclear attack was less of a priority than the Korean War. This meant that up through 1952, the FCDA was relegated to gathering emergency supplies and performing studies, as they remained underfunded for larger goals.

A few months after the Eisenhower administration began in 1953, a Soviet test of a hydrogen bomb gave the FCDA increased attention. However,

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27 Federal Civil Defense Authority, 1951, "Annual Report for 1951," 50.

28 Federal Civil Defense Authority, 1951, "Annual Report for 1951," 37.

Eisenhower followed the same approach as Truman, deciding that burden of civil defense belonged to local and state governments. This meant that funding remained low while the perceived importance of civil defense grew. Val Peterson, the new FCDA director under Eisenhower, chose to direct focus from shelter programs to evacuation, as it would provide the most cost effective means of dispersing the population out of major target zones. Peterson emphasized the feasibility of evacuation when he stated that during peak business hours in the Loop in Chicago there were 900,000 people, and only 90,000 a few hours later. He noted that evacuation was second nature to Americans who commute in the larger cities, and so testing evacuations for emergencies would be an easy and logical maneuver.[29] Originally, there were small evacuation drills in volunteering cities, but in June of 1954 the evacuations grew to a singular civil defense program called Operation Alert.

The 1954 Operation Alert was the first evacuation drill to occur on a national scale, with state and local officials meant to be working together across the country. The FCDA had hoped that people would have high public participation and would see this as a way to show that there was plenty being done by the state and local governments in order to keep citizens safe. However, the 1954 Operation Alert was still fairly modest. Only twenty states with around 62 million people in them had public participation in the drill, and only three of the involved states were west of the Mississippi River. This meant that most of the public simply saw civil defense forces in operation, rather than both civil defense and civilians participating with each other. However, only civilians in the

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[29] Federal Civil Defense Authority, 1954, "Annual Report for 1954," 9.

Northeastern part of the US participated in the drill. In the rest of the nation, the only participants were civil defense officers.[30]

After the first Operation Alert, the FCDA went through each region that took part in the drill and evaluated whether or not the drill had been successful. Since it was the first test, they did not know what to expect, and the results varied widely, even within states. Throughout the nation, the northeast received most of the FCDA's attention and served as a lesson of what was to come. Evacuations in major cities like New York, which was a critical target area and a key location for future Operation Alert tests, went as planned. Civil defense authorities created a successful warning alert, and civilians cleared the streets. In New York, this meant clearing out subway stations and other buildings that were packed full of people as quickly as possible. However, other key targets did not have the same results. In Buffalo, evacuation was simply discussed and not acted on except in industrial areas. In Boston, civil defense authorities concluded that they should create some sort of evacuation procedure but did not have one in place to test and thus did not participate. Throughout other areas, the results varied just as much. There was a breakdown in the alert system in Hallowell, Maine which prevented people from participating at all. In Lexington, Kentucky there was a radio announcement that caused confusion and panic despite previous statements that clarified that it was only a drill. Ultimately, the lack of public participation throughout most of the country made it difficult for the FCDA to develop casualty reports or anything more in depth than a simple analysis. The FCDA determined that Operation Alert could be done well, but future tests were required.[31]

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30 Federal Civil Defense Authority, 1954, "Annual Report for 1954," 32.

31 Federal Civil Defense Authority, 1954, "Annual Report for 1954," 44.

The FCDA used the knowledge that they had gained from the first Operation Alert in the following year's test. The purposes of the event, according to the FCDA in the 1955 Annual Report, were to: "(a) promote civil defense training and public awareness; (b) test technical and logistic planning and operational readiness; (c) test local evacuation plans; (d) test operational changes resulting from the evaluation of Operation Alert 1954; (e) determine additional operational or policy requirements."[32] The FCDA regarded the first goal, promoting training and public awareness, as one of its most improved areas, as it had been a failure the year before. This was also in line with the goals of both informing the public and providing a defensive strategy for them to use. Officials also attempted to further include the public, as many city and state governments made the tests mandatory. This helped with the success of the 1955 exercise, as it provided the FCDA and federal government with more accurate casualty reports and better understandings of their deficits. The event also received considerable news coverage, with hundreds of articles about the results of the test published in the aftermath of each Operation Alert.

By 1955, this event was active in more than forty-eight states, multiple territories, and in a joint civil defense test with Canada. President Eisenhower himself participated in the drill, and then appeared afterwards on television to announce the FCDA figures on the casualties that the simulated attack would have incurred. He stated that there would have been eight million fatalities, six and a half million additional casualties, and more than twenty-five million citizens (approximately one-sixth of the American population) would be homeless.[33] The

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[32] Federal Civil Defense Authority, 1955, "Annual Report for 1955," 32.

[33] Laura McEnaney, *Civil Defense Begins at Home: Militarization Meets Everyday Life in the Fifties* (Princeton: Princeton University Press, 2000), 52.

FCDA later announced that they believed another eight million people would die in the weeks that followed from other factors, such as radioactive fallout.[34]

These numbers differed from the 1954 Operation Alert, as the figures had grown larger. To keep these numbers in perspective, the FCDA compared the hypothetical death toll for this drill to the total military deaths of the Allied nations in the entirety of World War II, noting that the possible nuclear attack was barely higher. They also noted that the Japanese military losses during the war amounted to around 1.3 million people, and should an enemy nation drop a bomb on Rockefeller Square it would result in very similar numbers.[35] Despite these figures, the FCDA believed in 1954 that Operation Alert was "the most effective training device that the federal government has yet sponsored."[36]

As previously mentioned, the dispersal of people was one of the key strategic aspects of Operation Alert. The FCDA used Operation Alert to observe how people dispersed to provide accurate details in terms of the projected casualties, which differed greatly from city to city.[37] In New York City, even the New York Stock Exchange was shut down for the day of the test, and the public cleared and evacuated the floor of the stock exchange within five minutes.[38] Because there were more than six hundred air raid sirens in densely-populated New York, the population was easily informed of when the test started.[39] As a

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34 Federal Civil Defense Authority, 1955, "Annual Report for 1955," 37.

35 Federal Civil Defense Authority, 1954, "Annual Report for 1954," 34.

36 Federal Civil Defense Authority, 1954, "Annual Report for 1954," 90.

37 Val Peterson, 1955, "Address," 41-50.

38 Phillip Benjamin, "Forty-Six States Respond to Alert in Mock Attack," *New York Times*, May 7, 1958.

39 "N.Y. Is Ghost Town in Atom Air Raid Drill," *Los Angeles Times*, September 26, 1953.

result, New York had a massive turnout for Operation Alert, with most of the city's residents participating in the drill.

Los Angeles, on the other hand, experienced nearly opposite results. Because of the large area in which its three million inhabitants were spread, only approximately fifteen hundred civil defense volunteers actively participated in the Los Angeles Operation Alert.[40] The immense geographic size of the city also made it harder to organize an actual evacuation simulation, since the majority of the population ignored the sirens and simply continued on with their day. After several hours of drills, the FCDA estimated a tally of one million casualties resulting from an attack involving three atomic bombs. This result prompted the *Los Angeles Times* to proudly proclaim that Angelinos had "survived the make believe attack" despite the lack of participation.[41]

Successes were regularly reported on Operation Alert even when testing from outside the FCDA did not always support these findings. For example, in the 1955 Operation Alert, civil defense authorities estimated that only three-hundred and fifty thousand of Milwaukee's population of one million would be casualties of a nuclear attack, with the majority of survivors being homeless.[42] However, this did not line up with other reports that were made at similar times. The Milwaukee traffic committee found in a report the year before that even if they had seven hours of warning and perfect conditions, it would not be possible to fully evacuate the metropolitan area of Milwaukee. Even though the ballistic missile had not yet

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40 "Plan for Dispersal of City's 2,000,000 in Bombing Told: Operation Alert Scheduled Here Next Wednesday," *Los Angeles Times*, June 10, 1955.

41 "Southland 'Survives' Three Make-Believe Bombs In Test," *Los Angeles Times*, Jun 16, 1955.

42 Federal Civil Defense Administration. "A Report on the Washington Conference of Mayors and Other Local Government Executives on National Security, December 2-3, 1954," 41.

been developed, in 1955 it was projected that there would be merely fifteen minutes between the first warning and the first bombing in the states. It is no wonder that Milwaukee's mayor, Frank Zeidler, claimed that the results were "Not as optimistic as we hoped."[43] In another instance, the deputy director for civil defense in Washington D.C. refused to participate and was fired for it. He claimed that the command post was completely inadequate, and called the entire event "not a drill but a show."[44]

Some newspapers did not support the claims that Operation Alert was as successful as officials had announced. A *New York Times* article from 1955 explained that even though there were cities that had civil defense systems in place that were more than adequate for an attack that mirrored the simulation in Operation Alert, these civil defense systems were uncommon. The article reported that the personnel, resources, and shelters were overwhelmingly inadequate for an actual attack and could only provide for a small percentage of the population. However, this report was still able to find praise for Operation Alert, saying that the communication systems used in the drill were sufficient in relaying information between officials.[45]

Other issues that plagued Operation Alert were due to unclear instructions which caused chaos and confusion amongst participants. In the1958 Operation Alert, multiple cities in Connecticut claimed to not have received the initial alert from their headquarters. Upon attempting to clarify their instructions, the officials were given conflicting instructions that caused them to activate their early warning

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43 "Remarks of Frank P. Zeidler," Report on the Washington Conference of Mayors, 41.

44 Alvin Shuster, "President and his Aides Leave Washington Before Mock Hydrogen Bomb," New York Times, June 16, 1955.

45 "The Nation," *New York Times*, June 19, 1955.

sirens and all-clear sirens at the wrong times, resulting in the test not proceeding as planned.[46] An even greater mishap occurred when a transmission drop caused the message from the secretary of agriculture to be misheard, resulting in farmers across the nation believing that the broadcast was real rather than part of a simulation. This message, which regarded ending acreage restrictions on wheat and tobacco, was meant to be an example of something that would be a part of an actual nuclear emergency, since acreage restrictions were in place in order to prevent a surplus from occurring. Since these restrictions were highly beneficial for farmers, a massive protest formed shortly after the broadcast since they did not know the message was not official. However, because both the secretary and the assistant secretary of agriculture were participating in Operation Alert, they were in secure bunkers and were not immediately able to be reached in order to promptly correct the mistake.[47]

Not only did Operation Alert create doubt in the minds of some officials, but a large group of Americans demonstrated against the event. Most notably, Dorothy Day led several protests during Operation Alert in New York City. Day was a prominent pacifist and activist through the middle of the twentieth century and had many notable protests, such as a hunger strike in 1917 for women's suffrage and later in 1970 against the Vietnam War. Day remained on the streets during the drill, handing out pamphlets decrying the civil defense programs. Each pamphlet contained statements like "There is no defense in atomic warfare, we know this drill to be a military act in a cold war to instill fear, to prepare the

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46 Phillip Benjamin, "Forty-Six States Respond to Alert in Mock Attack," *New York Times*, May 7, 1958.

47 "Mock Crop Order Arouses Farmers," *New York Times*, June 17, 1955.

collective mind for war. We refuse to cooperate."[48] Since Operation Alert was a mandatory event and failure to comply was a misdemeanor with up to a year in jail or a $500 fine, Day and her associates found themselves in legal trouble. From 1955 until 1959, the police arrested Day each year for protesting against Operation Alert in public spaces. In 1955, Day and six others pleaded guilty to the charges, but ultimately had their sentences suspended as the judge "did not want to make any martyrs."[49] Each year thereafter, Day received a full punishment for her protests, and she chose to spend time in jail rather than paying the fines. The sentences varied, but in total she spent approximately six weeks in jail over this five-year period. Day was never alone in her protesting, however, as she was able to accrue a sizable group of followers who, despite the legal ramifications involved, joined her in refusing to simulate the evacuation. During several of the years, the judge in charge of the case suspended the sentences of the first-time offenders, which in 1959 accounted for twelve of the seventeen protesters.[50]

Protests other than Day's, however, tended to not receive the same legal crackdowns. In Rochester, New York, several students in the Quaker Society of Friends stood outside and passed out pamphlets stating that they could not participate in preparations for war. Despite breaking the same laws as Day, the police took no action against this group and did not ask them to even leave the premises.[51] Attacks on Operation Alert came from other political groups as well, with the American Communist Party decrying the event in their weekly

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48 Ammon Hennacy, *The Book of Ammon*, (Eugene: Wipf and Stock, 1994), 310.

49 "7 Pacifists Insist On Guilty Pleas," *New York Times,* September 29, 1955.

50 "Five Who Defied Air Raid Jailed," *New York Times,* April 25, 1959.

51 "Nine Pacifists Seized in Defying Alert," *New York Times,* May 7, 1958.

newspaper.[52] In another instance, a mother and her two children were arrested while out during Operation Alert. She told police that she was "sick and tired of being forced underground like a desert rat." This showed that despite the overwhelming participation in the event, there were still people who treated it as an inconvenience rather than a potential lifesaving exercise.[53]

Operation Alert followed the military and propaganda goals that the FCDA attempted to accomplish, yet it still faced problems in both regards. While plenty of people participated in the event after its first year, protests and citizens apathetic to the event plagued Operation Alert. This shows that Operation Alert failed to serve as a means to persuade the public that they would be safe. In addition, the numbers that Operation Alert produced still resulted in vast casualties, meaning that it would serve as a minor deterrent at best if the FCDA were completely accurate. However, in the view of the FCDA, there was always more planning that could be done. Despite these downsides, the FCDA continued to use Operation Alert since it provided a simple and cheap solution to the FCDA's goals.

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52 Jack Lotto, "Operation Alert is Latest Abuse Target of U.S. Reds," *The Milwaukee Sentinel*, November 1, 1961.

53 Phillip Benjamin, "H-Bomb Test Raid Stills Bustling Cities," *New York Times*, April 18, 1959.

CHAPTER 2: CONELRAD

Operation Alert served as a major way for the Federal Civil Defense Administration to test their evacuation procedures and determine if there were any faults or deficits. However, civilian management was not the only means of civil defense used to try and alleviate the effects of a nuclear attack. Since the goal was to keep the populace safe and morale high, the federal government also looked into ways to keep attacks from being able to occur in the first place. After all, it would not need to worry about evacuation if there was no risk of a nuclear strike. While the fear of nuclear retaliation served as the largest nuclear deterrent – a deterrent that the Soviet Union also employed – the U.S. government also looked into preventative measures. In terms of civil defense, one of the first and longest lasting measures was the Conelrad system. From 1951 until 1963, Conelrad was meant to serve both as a means to prevent attacks and inform the public, filling in the dual role that most civil defense programs had of militaristic defense and social propaganda.

The idea for Conelrad came from World War II tactics and technology, and the many bombing attacks that occurred during that war. A common technique for ensuring a bomber was on the optimal course during WWII was to use the signal from a radio station as a sort of compass, since following it to the source would lead a pilot to the city they were targeting. While this was not the only means of navigation in this time, it served as a surefire way of getting a pilot to their destination, and was one that the U.S. government sought to use as a means of deterrence. This concept led to the development of Conelrad. In the event that the U.S. government detected an attacking bomber, the radio broadcasts throughout the whole country would be deactivated to prevent them from being used as a

tracking signal. Following this deactivation, the signals at certain radio stations would be switched manually to the 640 or 1240 AM frequencies.[54] By changing every station to these two frequencies, the signal could then be turned off in one location and on in an entirely different one and an airplane using it for navigation would not be able to tell. [55] Therefore, they could bounce the navigation around wildly, keeping the bomber off-target for longer and allowing a better chance of survival for the population. In addition, anyone who tuned into the frequencies would be able to hear an uninterrupted radio broadcast, which provided key information about safety and the status of the bombings.

The government viewed radio as the best means of disseminating information to the public during a threat due to the availability of portable, battery powered radios and the greater range that radio signals could provide. Val Peterson, who served as governor of Nebraska prior to his position as FCDA administrator, stated that "Modern buildings with their air-conditioning and tight construction make it difficult to hear sirens." and emphasized a greater need to switch toward radio communications.[56] By spreading the knowledge of Conelrad, government officials hoped to develop a system that had both military and civil purpose while also ensuring that Americans were aware that measures were being taken to protect them from attacks. While this was a solid plan in theory, the development of Conelrad hit several snags that kept it from being the national defensive project that it was hoped it would be.

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54 Federal Communications Committee, 1953, "Nineteenth Annual Report," 25.

55 Federal Communications Committee, 1952, "Eighteenth Annual Report," 2.

56 California State Department of Education, "Civil Defense for Personal and Family Survival," 1956, Vol. XXV, No. 1, 7.

Conelrad's development began in 1951 as a joint project between the Department of Defense (DoD) and the Federal Communications Committee (FCC), with the DoD figuring out the technical aspects and the FCC creating regulations for radio and television broadcasters to follow in order to create the most effective system possible. The FCC developed a regulation that required other stations to go off the air whenever Conelrad activated, which was the key to the entire system working. The DoD was less successful, and found that they could not create a system that would work while television and FM radios were on, which necessitated turning off all broadcasting signals regardless of their origins.[57] Luckily this was within the FCC's power, allowing them to create a system that they claimed typically worked as intended.

The initial controlled tests of the Conelrad system were promising to the FCC and were completed to satisfaction, with approximately 80% of cities developing some sort of Conelrad participation.[58] While the FCC noted that it would not be possible to achieve complete coverage of the entire United States, it would be able to provide target areas with the security they would need in the event of an attack. In order to complete the test to its fullest, several airplanes attempted to track the Conelrad signal and were left confused and off course, while commercial airlines made comments on how it affected their flights during the test.

Despite this, Conelrad was plagued with problems from its inception. While the FCC initially claimed that it worked as intended, it started poorly and grew more obsolete with each passing year. First, Conelrad was a voluntary project,

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57 Federal Communications Committee, 1954, "Twentieth Annual Report," 27.

58 Federal Communications Committee, 1954, "Twentieth Annual Report," 28.

which meant that each station had to pay for its own equipment in order to be Conelrad compliant. After one year, this cost totaled more than two and a half million dollars across thirteen thousand radio stations, which represented just over half of the nation's broadcasting stations in 1955.[59] Individually, a new radio broadcasting transmitter could cost upwards of fifty thousand dollars, and the FCC rarely provided any financial support.[60] In addition, television and radio stations were required to disable their broadcasts while Conelrad was enacted during drills, costing them revenue. People using CB radios and other personal hobby radios soon had to deal with these costs as well, since their use required the operator to be Conelrad compliant.[61] Conelrad also required the complete participation of every radio station in order to be effective. During one instance of testing, a rock and roll station came through on one of the Conelrad frequencies, since the disc jockey did not know he needed to silence his station. In addition, Mexican radio stations that were not under FCC jurisdiction still broadcasted across the clear airwaves.[62]

Secondly, Conelrad was slow to activate, since it required manually removing a frequency crystal used for broadcasting and replacing it with another one for the proper frequency. This process took several minutes to complete, and since it was estimated that there would only be approximately fifteen minutes between the first confirmation of an attack and the attack itself, this issue of time would be crucial.[63] It also rested on the notion that all of the stations would receive

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59 Peter Kihss, "Emergency Radio a Jumbled Success," *New York Times*, September 17, 1953.

60 Val Adams, "WNYC Asks Court to Reverse F.C.C." *New York Times*, November 1, 1954.

61 Phillip Benjamin, "H-Bomb Test Raid Stills Bustling Cities," *New York Times*, April 18, 1959.

62 "Some Boo-Boos Found in Civil Defense Test," *Los Angeles Times*, April 29, 1961.

63 "City Wins Appeal on Defense Radio," *New York Times*, May 7, 1955.

the information on time, which often proved to be a problem during the tests. Furthermore, each test of the Conelrad system happened at a predetermined time that allowed operators to be prepared and active as quickly as possible, which meant that in an emergency it was unlikely that they could respond as quickly as in the tests.

Finally, Conelrad downplayed the importance technological growth. Since Conelrad only broadcasted through two specific AM radio stations, citizens required access to an AM radio at the time when the regular broadcasts would cease. Also during this time, televisions and FM radio were becoming more readily available to the public, which were ignored in the implementation of Conelrad.

By the time the FCC enacted Conelrad, it was unlikely that it would have even been effective in its main military purpose, since there were other effective means to navigate other than radio signals.[64] However, the bigger change in technology was the implementation of ballistic missiles, which made the bomber almost obsolete. Because each ballistic missile had its own navigation system, Conelrad could do nothing to prevent them. Due to the speed at which a ballistic missile travelled, the time between intelligence and impact was shorter than that of a bomber, causing the issues of activation to be more pronounced than before.[65] While submarine based missiles had existed prior the intercontinental ballistic missile, there was far more warning from a submarine emerging and launching a missile than if they were to launch a faster missile from further away.

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64 "CONELRAD Fading Into Broadcast History," *Los Angeles Times,* August 4, 1963.

65 "Sign-off for Conelrad," *Time,* July 12, 1963, Vol. 82 Issue 2, 54.

Public institutions discredited Conelrad as its issues grew more apparent. In 1960, for example, the Johns Hopkins University's Operations Research Office conducted a test on Conelrad in order to determine its efficiency. They proposed that in order for an early warning system to be effective, it had to reach up to 90% of the population within thirty seconds of the alert being sent out.[66] Through their examination, they found that Conelrad came nowhere near this, due to weak reception in many areas and slow preparation times. Civilians were also shown to be confused and panicked at the activation of Conelrad, rather than prepared. In Lodi, California in 1960, an accidental activation of Conelrad prompted people to flood the radio station and police with phone calls, while few made any attempts to evacuate.[67] Ignorance of Conelrad extended beyond proper procedure as well. Despite it being mandated that every radio have symbols on the correct Conelrad frequencies, a survey in Pasadena showed that only 32% of the population was able to name what stations were used.[68]

Another issue with Conelrad came from police officers who felt that it restricted their ability to provide support in a real emergency, since it required silence on the airwaves. At the 22nd annual Conference for Police Communications Officers in 1956, they petitioned the Federal Communications Commission to allow them additional broadcasting stations. In addition, the officers believed that the intended military purpose was obsolete, and therefore it

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66 "Buzzers Mean Bombs," *Time,* November 14, 1960, Vol. 76 Issue 20, 26.

67 "Conelrad Alert Aired in Error Gets Plenty of Audience Reaction," *Lodi News-Sentinel,* December 5, 1960.

68 "South Pasadenans Get Low Defense Test Score," *Los Angeles Times,* June 19, 1957.

made sense to provide more channels to police broadcasts than to Conelrad stations.[69]

Despite the problems Conelrad faced, there were still positive reactions to its implementation. In addition to Kennedy's endorsement of Conelrad in 1961, there are records of government employees stating that they believed Conelrad was important. Several officials insisted on the necessity of creating devices that would alert citizens if Conelrad was ever activated. In Fredericksburg, Virginia, a city manager proclaimed "Tell them it might save their lives one day, if they know how to follow the procedure" in regards to why people should participate in a Conelrad test prior to the final Operation Alert.[70] New York City's mobilization director made similar statements, stating that "Conelrad would be the only means of receiving official direction for survival."[71] Some civilians were involved in spreading a positive view of Conelrad as well. This included a motorcycle club known as the Dragons who, after receiving their civil defense training in 1955, made a statement to American Motorcyclist stating the "extreme importance" of Conelrad and paying attention to early warning broadcasts.[72]

Starting in 1957, the Air Force and Weather Bureau began to use Conelrad as a means to communicate information to the public regarding other potential emergency situations. However, as Conelrad became more ineffective in its main purpose, other broadcasting systems were developed to supersede the program.[73]

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69 "Police Radio Operators Oppose Conelrad Plan," *Los Angeles Times*, August 6, 1956.

70 "Residents Urged to use Conelrad," *The Free-Lance Star*, April 27, 1961.

71 "Raid Test Today to Cover Nation," *New York Times*, April 17, 1959.

72 Harry Rector, "The Dragons MC Gets Praise for Work in Civil Defense," *American Motorcyclist*, July, 1955.

73 Federal Communications Committee, 1960, "Twenty-sixth Annual Report," 31.

In February of 1958, a new broadcasting service imitated Conelrad by providing information regarding storms and other threats in the event that the information was crucial. This resulted in Conelrad being delegated by the DoD into an entirely military purpose, and officials would only activate it during Operation Alert.[74]

The most common term used to describe Conelrad by civil defense authorities was "generally practical," a term that was first used by the FCDA in its initial tests. [75] Had there been an actual nuclear attack, it is possible that Conelrad would have served its purpose to the extent that it could. However, by the end of the 1950s, it was clear that that the social and civil defense aspects of Conelrad were not going to be effective in the event of a nuclear war.

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74 "Radio and TV Stations Will Warn of Storms," *New York Times*, February 19, 1958.

75 Federal Civil Defense Authority, 1954, "Annual Report for 1954," 5.

CHAPTER 3: CHANGING SITUATIONS IN CIVIL DEFENSE

On April 28, 1961, a recorded speech of President John F. Kennedy transmitted throughout radios in the United States while all other radio and television broadcasts were silent. Once his piece had concluded, other officials followed him with similar messages. For half an hour, Kennedy and other national, state, and local officials were the only voices that could be heard on the airwaves. These messages were one part of a larger experiment. The FCDA tested civil defense initiatives throughout the country while American citizens were participating in drills and simulated evacuations. Civilians cleared the streets of New York City, except for hundreds of protestors and demonstrators against civil defense who instead stayed out in public.[76] During his speech, Kennedy stressed the vital importance of this entire exercise, referring to it as an act of "peaceful preparedness." While he did not expect war, he explained, "common prudence demands that we take all necessary measures to protect our homes, our institutions, and our way of life, so that they can survive should an enemy thrust war upon us."[77]

This speech marks the end of both Operation Alert and Conelrad. While the federal government developed the two programs for different defensive purposes, both were created to reassure the public that the government was keeping them safe. This moment showed both the military and social aspects of civil defense programs of the 1950s, while also demonstrating the progression that civil defense

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76 Foster Hailey, "Streets Cleared in Defense Drill; Test Nation-Wide," *New York Times*, 29 Apr 1961, 1.

77 John F. Kennedy, "Remarks Recorded for Broadcast During the Annual Civil Defense Exercises," April 28, 1961, Online by Gerhard Peters and John T. Woolley, *The American Presidency Project*. http://www.presidency.ucsb.edu/ws/?pid=8094.

had made since its inception. In the previous chapters, Operation Alert and Conelrad were described at length to show that the foundation of civil defense programs, regardless of their purpose, lay in those military and social aspects. They also conveyed the numerous faults that civil defense programs tended to have, as even the most tested and planned civil defense programs were met with instances of cynicism and disdain. This chapter will explain why civil defense administrations continued to use these systems for nearly a decade despite the faults and issues that both experienced in their usage.

The continued use of Operation Alert and Conelrad stems from the third aspect of civil defense Eisenhower imposed, which was a small budget. Even the larger expenditures that Eisenhower approved tended to have less of a focus on civil defense. One of Eisenhower's key pieces of legislation was the Federal-Aid Highway Act of 1956, which connected much of the country with larger, multi-lane highways.[78] Drawing on his experiences in Germany and the Autobahn, Eisenhower knew that connectivity by roads was key to military logistics. Although this highway system also contributed to greater ease of access for evacuation attempts, for Eisenhower the military was the key importance that made the expenditure worthwhile. While Eisenhower did provide some assistance to civil defense, albeit minute or indirect, several major events caused the Eisenhower administration to change its direction on civil defense programs.

In 1957, the Soviet Union delivered two major blows to the United States. The first came in August, when they launched the first successful test of an intercontinental ballistic missile, or ICBM. While short range missiles had existed for some time – and many of the Operation Alert drills expected attacks to come

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78 "Federal-Aid Highway Act of 1956," Public Law 70-627, *U.S. Statutes at Large* 70 (1956): 374-402.

from missiles launched from nuclear-equipped submarines – the ICBM could attack at far a greater range and at a much faster speed, reducing the response time that civil defense programs would have to take effect.[79] While the United States had been working on its own ICBM, the Atlas, the initial tests had been failures, and would not have an operational ICBM until August, 1959.

The second major blow came two months later, when the Soviet Union launched the first manmade object into space. The Soviets successfully propelled Sputnik 1 into low orbit around the Earth, and proved to the United States government and the American people that the Soviet Union had far better technology at their disposal than many previously believed. While the U.S. Army was developing a "several hundred mile" missile, it was fraught with problems and could not compete with Soviet technology.[80] In an attempt to recover from this assumed defeat and maintain their image of being in control, U.S. government officials sought to restructure and reexamine their civil defense options.

Eisenhower tasked the Security Resources Panel of the President's Science Advisory Committee with compiling a thorough examination of the civil defense systems that were in place. Known as the Gaither Report, after its initial leader H. Rowan Gaither, the committee was tasked to form a broad opinion about the various options that the United States government and population had in the event of a nuclear attack. The Gaither Report received consideration from Eisenhower and his top aides due to the timing of its release, only a month after Sputnik, and the dreary message held within. The committee recommended government officials take immediate action with both passive and active defense programs,

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79 "Soviet Missile," *New York Times*, September 1, 1957.

80 Summary of a Conference on the Army Missile Program, Washington, August 12, 1957, 10:30 AM.

since the Soviet Union showed no sign of stopping and the civil defense programs were deemed far from sufficient. This was a key moment in American civil defense, as it came while spirits were at their lowest and showed a clear examination of many of the flaws that faced programs such as Operation Alert and Conelrad.[81]

First and foremost, the Gaither Report noted that the Soviet Union had developed multitudes of long range ICBMs that could hit a target up to nine hundred miles away, even more intermediate-range ballistic missiles with a range of about six hundred miles, and many high-speed jet aircraft capable of delivering an atomic payload. This showed the flaws that came from the mindset that developed Conelrad and Operation Alert, where civil defense expected a great deal of time in order to act in between first knowledge of an enemy nuclear attack and detonation. Since the alert capabilities of the United States Strategic Air Command had not kept up with the pace of Soviet technological advancement, there would not be enough time to properly alert the public or institute a realistic evacuation procedure.[82]

In regards to civil defense, the Gaither Report noted the two main flaws were a lack of air defense systems and the complete lack of adequate fallout shelters. By examining the cost-effective solutions that had been in place prior to the report, the committee was able to conclude that it was not necessary to build full blast shelters in the heart of every city, inadvertently vindicating the decision to rely on evacuation rather than a full shelter program. However, fallout shelters designed to protect from radiation were located outside of cities, where they would

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81 Security Resources Panel of the Scientific Advisory Committee, 1957, "Deterrence & Survival in the Nuclear Age," 3.

82 Security Resources Panel of the Scientific Advisory Committee, 4.

not likely need to be strong enough to withstand the full blast, were said to be the necessary solution. If additional air defense systems were in place to increase the time allowed for evacuation, it would be a more efficient and cost-effective way to save lives.[83]

It did not take long for the message within the Gaither Report to be leaked to the public, causing a multitude of reactions among the American populace. The perceived weakness of the United States in comparison to the Soviet Union was threatening and frightening to many, forcing White House press secretary James C. Haggerty to make a damage control statement saying that the United States was actually in a position of strength.[84] The idea that the United States was seen as weak by its leadership was so shocking that the *Los Angeles Times* decried the leaked report as a scare tactic, questioning its interpretation.[85] On a similar note, a letter to the *New York Times* by an American citizen asked if the weapons described by the Gaither Report were any worse than the fear that the public had experienced since the Soviet Union first acquired the hydrogen bomb.[86] In the *New York Times*, an article on the Gaither Report stressed that it was not the time to panic, since Sputnik was not the end of America's lead on the Soviet Union, but it was entirely possible that the United States could be surpassed unless they "snap out of their coma, forget about lowered taxes and gold plated TV sets, and get to work."[87]

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83 Security Resources Panel of the Scientific Advisory Committee, 18.

84 Jay Walz, "White House Says Gaither Report Found US Strong: Hagerty Declares," *New York Times*, December 29, 1957.

85 "The Fright Campaign Has Started," *Los Angeles Times*, December 22, 1957.

86 John Lofton, "To Avoid Nuclear War: Negotiation Rather Than Reliance on Military Force Advocated," *New York Times*, January 28, 1958.

87 "The Gaither Reports Again," *New York Times*, December 31, 1957.

Despite the pressure and fear that developed after the Gaither Report leaked, the report did not persuade Eisenhower to act on its suggestion to build fallout shelters. The limiting factor presented in the Gaither Report was the same as it had been before: money. In the report the committee estimated that this fallout shelter plan would cost approximately twenty five billion dollars.[88] While the leaked report put Eisenhower into a tougher position, with Senator Lyndon B. Johnson requesting that he release the full report to Congress, he remained steadfast in his political convictions.[89] As he had with Val Peterson's requests for a publically funded shelter program, Eisenhower refused to allocate funds for the requested fallout shelters. At the urgings of Secretary of State John Foster Dulles, Eisenhower opted to focus rather on full retaliation as the main means of deterrence.[90]

In response to the Gaither Report, Eisenhower instead restructured the existing civil defense organizations. Eisenhower merged the Office of Defense Mobilization, which dealt mostly in defensive military mobilization, and the Federal Civil Defense Administration into the new Office of Civil and Defense Mobilization (OCDM).[91] This merger also allowed for the federal government to provide funding for local and state civil defense projects, which it previously did not.[92] However, this reorganization did not result in a surge of funding for the new

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88 Security Resources Panel of the Scientific Advisory Committee, 20.

89 "The President's Letter," *New York Times*, January 23, 1958.

90 Allan M. Winkler, *Life Under a Cloud: American Anxiety About the Atom* (Urbana: University of Illinois Press, 1999), 120.

91 "To further amend the Federal Civil Defense Act of 1950, as amended, and for other purposes," Public Law 85-606, *U.S. Statutes at Large* 72 (1958): 532-35.

92 Dwight Eisenhower, "Letter to Leo A. Hoegh, Administrator of Federal Civil Defense, on His Becoming Director, Office of Defense and Civilian Mobilization," June 24, 1958.

OCDM. Instead, in its first year the OCDM received only approximately sixty-four million dollars, which was similar to what the FCDA received in 1951. However, the FCDA had far fewer initial obligations than the OCDM.[93]

The OCDM undertook the adoption of a new national plan for shelters as one of its first major developments. While previously sheltering citizens rested on the shoulders of the state and local governments, the National Shelter Policy was a federally backed program to ensure fallout protection for the American public. The FCDA originally drafted the National Shelter Policy in 1957, but the OCDM put it into practice after the merger. The National Shelter Policy contained five parts: stating that the administration would provide information to the public on the possible effects of nuclear attack and how to work with the government to deal with them; survey existing buildings to determine whether or not they will be able to function as practical fallout shelters; accelerate research into the placement of fallout shelters in existing buildings; construct prototype fallout shelters to be used as models for different climates; and incorporate fallout shelters into appropriate government buildings for public use.[94] Of the five aspects of the National Shelter Policy, the one thing that was clearly absent was any attempt by the federal government or OCDM to provide widespread shelters for the public. Even the incorporation of fallout shelters in government buildings was designed to show leadership by example, and not to serve as a solution.[95]

Rather than provide federal funding, the Eisenhower administration and OCDM urged the public to construct their own shelters. As a part of the National

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93 Office of Civil and Defense Mobilization, 1959, "Annual Report for 1959," 5.

94 Office of Civil and Defense Mobilization, 1959, "Annual Report for 1959," 5.

95 Federal Civil Defense Authority, 1958, "Annual Report for 1958," 9.

Shelter Policy, information was spread to the public on how to properly develop a personal fallout shelter. While personal shelters had existed before, this encouragement increased public interest drastically. In the years following the implementation of the National Shelter Policy, development of personal bomb shelters grew until it was estimated that approximately one million shelters existed in America.[96]

If the development of Operation Alert demonstrated the low-budget approach to public protection and the desire for cheap solutions, its implementation following the Gaither Report and National Shelter Policy showed the new direction of civil defense in the United States. The lessened need for evacuation and the growth of private shelters complicated Operation Alert's initial role as a means to protect the public through evacuation. Despite this change, it was still required due to its role as a means of quick mobilization. In the years following the National Shelter Policy, the focus of Operation Alert changed from a test of public protection to a drill of quick decision making and mobilization needed in an attack. Conelrad's role in Operation Alert further emphasized this focus, as it was first used in the 1959 drill to provide information to the public about the event. Rather than being termed as an evacuation, Operation Alert became "the testing of immediate and short-term responses of the people and their governments to a simulated nuclear attack."[97]

The inauguration of John F. Kennedy in 1961 provided a clear new path for civil defense. Kennedy was not as stringent with his civil defense budget as Eisenhower had been, since he believed civil defense held a greater importance

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96 Office of Civil and Defense Mobilization, "Information Bulletin," January 10, 1961.

97 Office of Civil and Defense Mobilization, 1960, "Annual Report for 1960," 60.

than previous presidents. In May of 1961, the newly inaugurated Kennedy called for a meeting of Congress to deliver a message on what he believed were the urgent national needs. In this speech, Kennedy laid out his clear goals for civil defense, stating the flaws in Eisenhower's approach to civil defense. Kennedy named the lack of budget and the lack of a solid national plan to protect people, but also noted that civil defense provides no deterrent and could not save everyone. Instead, Kennedy treated civil defense as a means of insurance "in case of an enemy miscalculation." In this speech, Kennedy promised to provide an adequate shelter program to the public and immediately reconstituted the OCDM into a new agency.[98]

Serving as a subset of the Department of Defense, the newly termed Office of Civil Defense (OCD) immediately began to grow beyond what it had been in previous iterations. The OCD requested approximately two hundred fifty-six million dollars to begin work on adapting civil defense into realistic, practical programs and received the full amount from Congress. The National Shelter Program was quickly adapted from its original hands-off approach and was changed to develop actual shelters for the public. The new National Shelter Program sought to find suitable shelters in existing buildings, to clearly mark them as shelters, and to stock them with food and water. This survey proved to be fairly successful, as by 1962 the OCD had located enough shelter space for nearly fifty-six million people.[99] This rose to one hundred and six million people the following year.[100] The funding allowed the OCD to improve the general infrastructure of

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[98] John F. Kennedy, "Special Message to the Congress on Urgent National Needs," May 25, 1961, *The American Presidency Project*, http://www.presidency.ucsb.edu/ws/?pid=8151.

[99] Office of Civil Defense, 1962, "Annual Report for 1962," 30-35.

[100] Office of Civil Defense, 1963, "Annual Report for 1963," 4.

civil defense drastically, which meant that programs like Conelrad and Operation Alert were no longer necessary and could be replaced or removed.

Kennedy's revitalization of civil defense resulted in Operation Alert losing any discernible purpose. The growth of a National Shelter Program that provided shelters to the nation, and the idea that defense against blasts was an impractical approach meant that evacuation was no longer a necessary goal for protection. Instead, Americans could simply find the nearest clearly marked fallout shelter, and would be safe if they were out of the blast range. In addition, more tests and drills were being performed regularly, and the single massive national drill was no longer required. The final Operation Alert took place in April of 1961, before Kennedy's speech to Congress.

Conelrad faced similar changes during Kennedy's presidency, but went through a slower removal process. By 1961, Conelrad was beginning to be phased out by the OCD since electromagnetic radiation was no longer a navigational factor. Until the developing Emergency Broadcast System was put into widespread use, Conelrad was kept in case it was needed. Conelrad came its closest to being put into use in October 1962. During the Cuban Missile Crisis, the possibility of an attack meant that Conelrad was in preparations to go into effect. However, the diffusion of the crisis meant that Conelrad was not needed. The following year, the FCC replaced Conelrad for good, and the more efficient and practical Emergency Broadcast System that replaced it remained for the next three decades.[101]

Operation Alert and Conelrad clearly follow the path of civil defense as a whole. Eisenhower's refusal to spend money on civil defense created an

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101 "Sign-off for Conelrad," *Time*, 7/12/1963, Vol. 82 Issue 2, 54.

environment for them to grow and change, since they served as cheap solutions to the military and social problems that civil defense sought to solve. The removal of Conelrad and Operation Alert marked a clear change in civil defense from inexpensive information on possible survival to competent programs, allowing civil defense to take a role as insurance rather than as propaganda.

CONCLUSION

The last Operation Alert in 1961 marked the end of an era of fiscally conservative civil defense programs. Seven years after its debut, and ten years after the founding of the FCDA, Operation Alert was no longer a necessary project. Fallout shelters replaced evacuation, a broadcasting system designed to supply all types of information to the public replaced Conelrad, and Kennedy's "insurance" replaced the brand of "Duck and Cover" civil defense that existed in the 1950s.

The technological differences between the early 1950s and early 1960s played a part in this change. The simple atomic bomb was replaced by the devastating hydrogen bomb. The short-range bomber was now backed by jet engines and warheads delivered by rocket powered payload systems. While adaptation to these changes were inevitable, the key change came from President Kennedy's willingness to fund civil defense beyond the paltry sums that Eisenhower had delivered.

Kennedy's budget boon to civil defense would not last. The spike Kennedy provided in 1961 allowing for a basic foundation for future civil defense projects, but the next few decades saw the budget for civil defense drop down once again. When Kennedy was assassinated and Johnson took the presidency, he rolled back civil defense spending, and congressional interest in civil defense quickly disappeared. The Vietnam War stole the interest of the public and the Johnson administration from civil defense, like the Korean War did for Truman. This left a neglected remnant of civil defense rather than the functioning system that was promised. The Nixon administration continued Johnson's trend of rolling back civil defense by all but cancelling shelter programs in favor of reexamining

evacuations. However, the political climate during Nixon's administration was drastically different. Strategic Arms Limitation Talks (SALT) and greater early warning systems led to an environment that was far less terrified of sudden atomic attacks, which in turn lessened the need for civil defense. While the following Ford, Carter and Reagan administrations took some interest in civil defense, very little was put into place, and far less funding was provided than in the previous four administrations.[102]

This lack of civil defense in later years started with the trends that Eisenhower began. Since Eisenhower's style of civil defense lasted most of his administration, with the higher budget Kennedy projects lasting a short time, later presidents saw cheaper solutions as adequate for civil defense. However, Kennedy's actions in raising civil defense budgets allowed Conelrad and Operation Alert to be replaced and removed. Because no president after Kennedy wanted to raise the budget, Kennedy's programs were sustained rather than built upon. Therefore, projects such as Operation Alert and Conelrad set the tone for civil defense in the remainder of the Cold War, but did not last beyond the Kennedy administration.

By the end of the Cold War, civil defense had become synonymous in popular culture with the Eisenhower and Kennedy styles of civil defense. Television shows and movies often depict the backyard bomb shelters that Eisenhower had promoted so heavily. The popular *Fallout* video game series uses the 1950s Americana aesthetic, with many of the characters surviving nuclear war in extravagant, government funded bomb shelters. Other aspects of 1950s civil defense appear elsewhere. On *The Simpsons*, Krusty the Clown uses the

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102 Allan M. Winkler, *Life Under a Cloud: American Anxiety about the Atom* (New York: Oxford University Press, 1993), 131-181.

emergency broadcast system in a small civil defense broadcast shack when all other television has been cancelled, and includes a worn photograph of Eisenhower in his impromptu comedy act.[103] While much about this is erroneous – since the Emergency Broadcast System was enacted during the Kennedy administration and Conelrad did not use television broadcasts – it is a clear demonstration that civil defense is associated with the Eisenhower presidency.

Civil defense has had a resurgence of interest due to changing political climates and eight countries known to possess nuclear weapons.[104] However, the lack of investment since Kennedy has resulted in little civil defense infrastructure other than the possibility of evacuation with the freeway system. While it is lucky that civil defense has not ever been needed, it does come in handy to have insurance. With renewed interest in civil defense, it will be beneficial to future historians to pay attention to the funding that civil defense projects received. As was noted in the historiography, historians have paid plenty of attention to civil defense and its role in propaganda. However, little has been done regarding the economic aspects of civil defense, which could provide new insights to how civil defense was adapted throughout the Cold War. While public memory of civil defense remains fixated on bomb shelters and duck and cover, further examinations of the economic influences and outcomes of civil defense would be a fruitful endeavor. This examination of Operation Alert and Conelrad hopefully encouraged that aspect, by showing how civil defense was a product of an

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103 *The Simpsons*, "Sideshow Bob's Last Gleaming,"137, directed by Dominic Polcino, written by Spike Feresten, FOX, November 26, 1995.

104 Bonhia Lee, "North Korea Threatens to Launch a Nuclear Attack. What Happened to Fresno's Fallout Shelters?" *The Fresno Bee,* August 24, 2017.

administration that felt it was important enough to implement some sort of civil defense, but did not want to put forward much money and had to make do.

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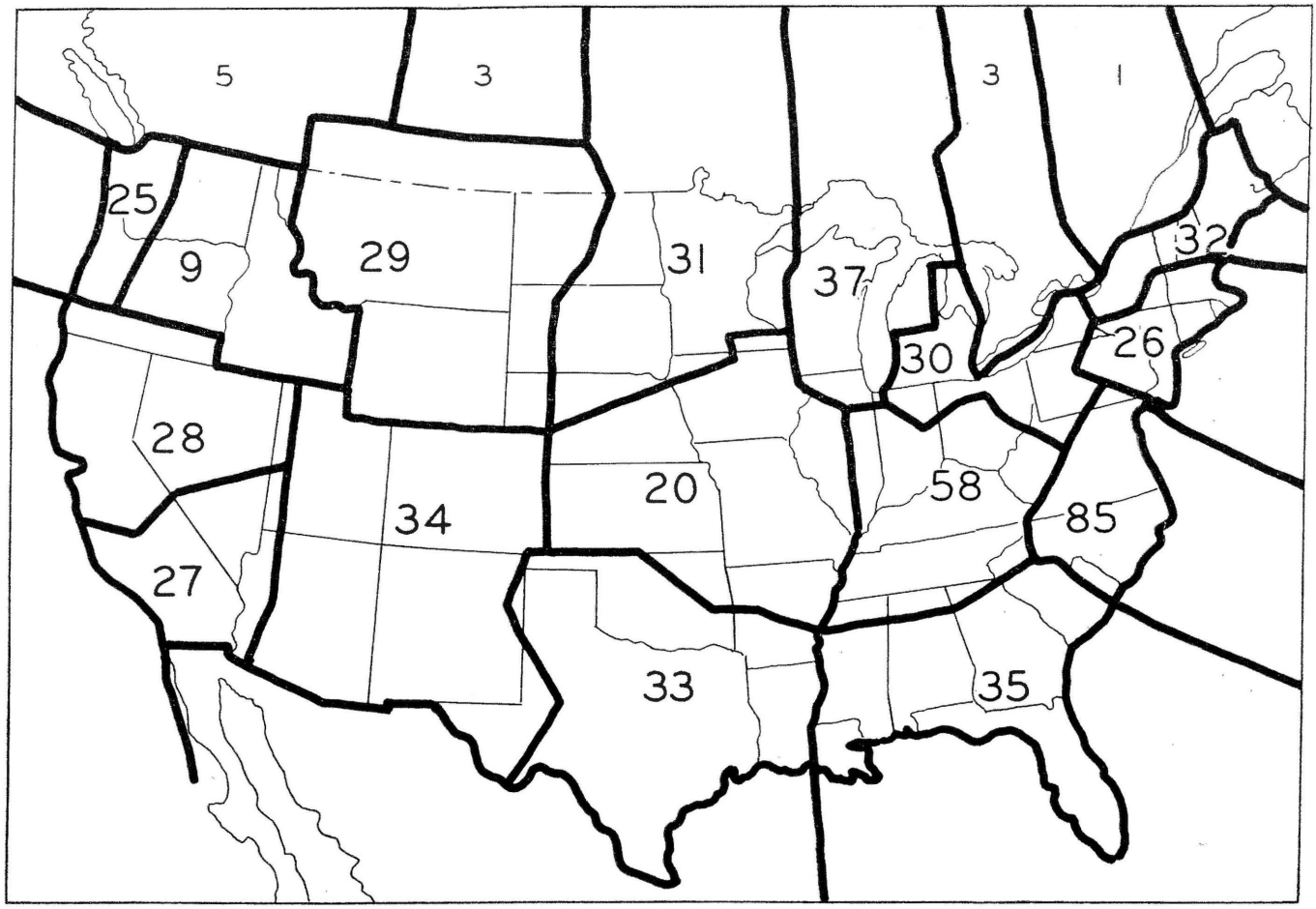


Conelrad alerts including tests may be broadcast in any or all of the 16 air defense zones of the United States

Conelrad—A Civil Defense Measure . . .

How Some Railroads are Participating

Civil defense procedure known as Conelrad, which permits civil defense broadcasting to continue during an air raid, requires cooperation of all radio broadcasting stations, including railroad radio stations, fixed and mobile. FCC regulations make railroad compliance mandatory by Jan. 2, 1957

TO PREVENT ENEMY AIRCRAFT from using radio stations for direction-finding in time of war, the government has established an alerting system designated as "Control of Electro-Magnetic Radiation," commonly known as Conelrad. The Federal Communications Commission has issued rules requiring standard broadcast stations to transmit special warning signals and also require all holders of radio station licenses to make provisions to receive these signals, and to either cease operation or restrict their operation as set out below.

The Conelrad alert will normally be received over a special receiver operating in the standard broadcast band. This special receiver will be on continuously, but the speaker is silenced automatically except when a special Conelrad broadcast is being received. The speaker is turned on by a special code signal which will be transmitted by standard broadcast stations. Following the special signal, the standard broadcast station will transmit the following Conelrad radio alert:

"We interrupt our normal program to cooperate in security and Civil Defense measures as required by the United States Government. This is a Conelrad radio alert. Normal broadcasting will now be discontinued for an indefinite period. Civil Defense information will be broadcast in most areas at 640 and 1240 on your regular radio receiver."

The message will be repeated twice. When the Conelrad radio alert message is received, all licensees of radio stations must immediately comply with the the Conelrad operation procedure for their particular service. The precise Conelrad radio alert control message quoted above will be broadcast only in the event of an actual alert. In the event of a Conelrad test or drill broadcast, stations will

make an announcement that a test or drill is taking place. During a Conelrad alert, the following action must be taken:

(1) No transmissions shall be made unless they are of extreme emergency affecting the national safety or the safety of people and property.
(2) All transmissions shall be as short as possible and the stations' carrier shall be removed from the air during periods of no message transmission.
(3) No station identification shall be given either by announcement of regularly assigned call signals or by announcement of geographical location. If identification is necessary to carry on a specially authorized service, the use of tactical calls or codes will be authorized.

After the alert is over, the standard broadcast stations will return to the air on their assigned frequencies and will broadcast the following message:

"Conelrad radio all clear. Resume normal operations. I repeat. Conelrad radio all clear. Resume normal operation." This information will release the radio stations for their normal operation.

The Conelrad radio alert may or may not be given over the whole country simultaneously. Instead, only certain zones may have the alert, there being 16 zones for the United States and 4 for Canada. Tests and drills may be conducted from time to time.

Here is what some railroads are doing to comply with FCC regulations.

Great Northern

We have already ordered a dozen Kaar Conalert radio receiving sets which we will place in all of our relay offices. They will be operated in the usual way, that is, being turned on all the time to the station from which we expect to get the best reception and who will be issuing the alarm.

So far we have not made any tests and do not know what the results will be, but do not expect to have any difficulty from an operating standpoint.

It is expected the relay offices will extend the alarm to the dispatchers who will contact all way stations with railroad radio to spread the alarm.

Illinois Central

Our program is to place suitable special radio broadcast type receivers in each of the offices of the chief dispatcher on whose division radiotelephone equipment in railroad service is operated. The receiver we will use is the Conalert II manufactured by Kaar Engineering Corp., Palo Alto, Calif.

Our operational procedures have progressed only to draft form at the present date. However, it will provide for the chief dispatcher, through his dispatchers, to issue appropriate instructions to all employees in charge of base stations to take such action as has been prescribed in written instructions that will have been distributed prior to January 1, 1957.

Missouri Pacific

Certain offices (relay telegraph and major yard offices) have been designated as primary offices, at which points automatic "Conalert" receivers are located. Certain other offices (dispatchers' offices) have been designated as secondary offices. When a conelrad radio alert has been received, the primary offices will notify all secondary offices within their respective territories, who will, in turn, notify all offices with radio base stations within their respective territories. Base stations will then notify all mobile stations within range. If a secondary office also is a radio base station, it will also notify all mobile stations within range. Mobile units not within range of a base station will be notified by any available means: telegram, train order, etc. The same procedure will be followed when the "Radio all clear" is received.

A log must be maintained for all Conelrad tests, drills, and operations. One form, for primary and secondary offices, is used to log information pertaining to stations notification for the "alert" and the "all clear." Information logged on the alert form includes the date, time alert received, offices notified and the time of notification, and signature of the person sending the alert message. The all clear form is similar. All base radio stations keep a Conelrad record which includes the following information: date, time alert received, time mobiles notified, time all clear received, time mobiles notified, use of radio during alert period, and signature of person sending the notifications.

New York Central

We are handling this matter on the New York Central by purchasing the Conalert II automatic radio alert monitor from the Kaar Engineering Corp. We are then installing these rack mounted units in our large relay offices which are located in an area which has one or more of our radio systems. Two channels of each monitor will be adjusted to receive Skywave key stations which are in the same air division as the railroad radio systems involved. The wire chief on duty in these telegraph relay offices will be responsible to take action when the monitor indicates an alert. The specific action to be taken will be for the wire chief to call the operator at the base station or stations in his area by telephone, advise them that an alert is taking place, and that they are to eliminate all but the most urgent of transmissions involving the safety of people or property on their radio system. The wire chief will also notify these locations to resume normal operations when the alert is over.

Pennsylvania

Our use of radio is confined in each instance to well-defined areas —principally yards. We are arranging to provide one receiver for each area involved, to be located at the control point of the base station in the area. In the few instances where several base stations are involved in a group, one of the base stations will be provided with the Conelrad receiver and will immediately advise all other stations in the group by radio, or telephone, when a Conelrad radio alert is received. We are obtaining Kaar Conalert II receivers.

We have prepared Conelrad instructions, composed from information in Subpart L of Part 16, FCC Rules and Regulations, which will be posted at all radio stations, explaining the action to be taken upon receipt of a Conelrad alert, and all personnel using radio will be instructed accordingly.

Rock Island

The Rock Island has added a brief statement on Conelrad to their railroad radio general and operating rules as follows:

During periods of imminent air attack enemy planes will try to use radio stations for navigational purposes. Accordingly the FCC has directed that radio stations, including those on railroads, be operated in a manner designed to prevent such use. When a Conelrad radio alert is received from the designated railroad official, all wayside

and yard radio stations will broadcast the word "Conelrad" three times at five second intervals. During time of such alert, radio will be used only when absolutely necessary and no station will give location by name but may use mile post numbers only. The Conelrad alert will not be acknowledged by mobile units when received but such units will acknowledge when cancellation of the alert is received.

Santa Fe

The alert warning will be received on special broadcast receivers which will be installed at key locations on the railroad. In order to comply with FCC rules dispatching, way station and yard forces will handle the alert as follows:

On receipt of the Conelrad radio alert the dispatcher will contact employees at all radio base stations on his territory by telephone, advising them of the alert. They are to broadcast that the Conelrad alert is in effect, advising mobile radio stations to cease operation except in extreme emergency, in which case transmission is to be short and use no identification. (See items (1), (2), (3) of the general discussion.)

On receipt of these instructions the employee at the radio base station will file a telegram acknowledging receipt of the instructions and stating the time the above message was transmitted. This message is to be addressed to the chief dispatcher and the radio service man who is in charge of the maintenance of the radio equipment. After the dispatcher has notified the base station employees of the alert, he will also transmit the following message to all trains in his territory, except those which are operating over districts where complete point-to-train communication has been established; for example, Winslow-Seligman, Amarillo-Waynoka and La Junta-Dodge City:

"To C & E —— we have received a Conelrad radio alert which indicates that there is an imminent threat of air attack. (Rest of message is items (1), (2), (3)."

Mobile units in range of the radio base station or the train engine crews of the trains addressed at outlying points will not reply to the warning. When the alert is over and an "all clear" signal has been received over the Conelrad special receiver, the dispatcher will notify all radio base station employees in his territory, requesting that they transmit the all clear.

The employees at all base stations will file a wire acknowledging receipt of the Conelrad "all clear" and stating the time that this information was transmitted. This message is to be addressed to the dispatcher and the radio service man who maintains the radio station.

In the case of Conelrad tests, the above procedure will be followed with the exception that the word "test" will be used instead of "alert" in the warning message and the word "test" will be used in the all clear message. Tests may be conducted periodically on this operation, and care should be taken to see that the full procedure is followed on tests, since a record must be made in the log of all stations for inspection by FCC field engineers.

Southern Pacific

We have purchased Kaar Conelrad alert receivers for installation in chief train dispatchers offices. We have also issued complete instructions to all chief dispatchers, radio station operators, and posted in all mobile units similar instructions covering procedures to be followed when Conelrad alert warnings are received on the above mentioned receivers. Briefly the procedure is as follows:

When Conelrad alert warning is received by the chief dispatcher information will be immediately relayed through the individual trick dispatchers to all train to wayside radio stations via the dispatchers telephone circuit. The chief dispatcher will notify all yard and terminal fixed radio station operators in his immediate vicinity via company or commercial telephone. Each base station will broadcast radio alert notice to mobile units within range, this broadcast being made for a period of approximately 3 to 5 seconds without identification.

Those mobile units, out of range of fixed stations, will be notified by telephone or Teletype circuits as quickly as possible. The all-clear signal will be handled in a like manner. Necessary records will be kept by chief dispatchers and fixed station operators in accordance with rules.

Union Pacific

We have recently released purchase orders for 13 Kaar type Conalert II Conelrad monitoring receivers. These units are to be installed in our major telegraph offices. When Conelrad alerts and clearances are received, it will be the responsibility of the wire chief to notify key personnel, who are concerned with operation of radio, at various points on his district.

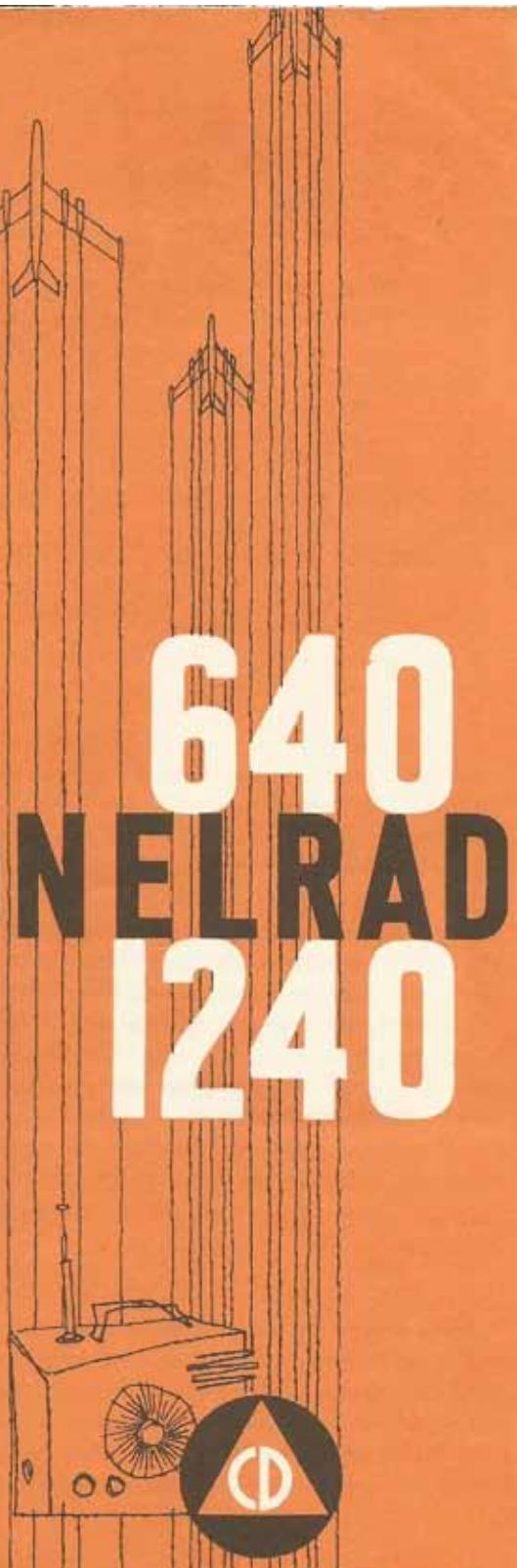
Instructions are being prepared to set up procedures to be put in effect during alerts. Forms will be printed which will provide a log of all interruptions to radios account Conelrad alerts.

CONELRAD

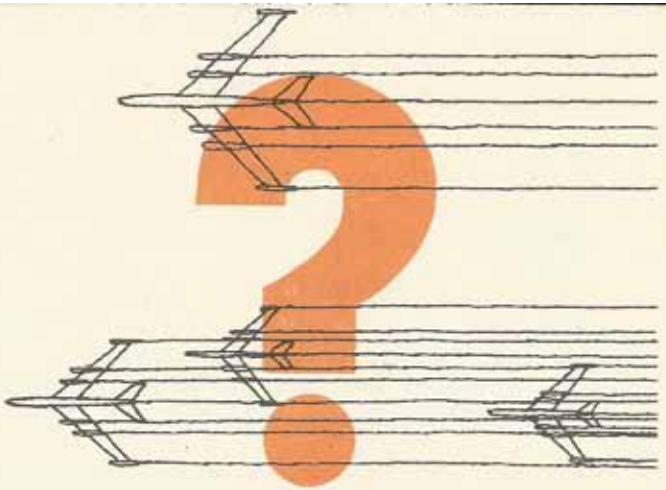
dial 640 1240

The Federal Civil Defense Administration has cooperated with a private producer in the preparation of a 10-minute, black and white film entitled "CONELRAD." Ask your local Civil Defense Director or TV station to arrange a showing.

640 CONELRAD 1240



FEDERAL CIVIL DEFENSE ADMINISTRATION



IF ENEMY BOMBERS APPROACHED OUR COUNTRY, WHAT WOULD YOU DO . . . ?

When the air raid alert sounds, how would you learn what is happening and what you should do?

Prompt, accurate civil defense information can help save your family, your life!

The CONELRAD system of public emergency broadcasting is the surest and fastest way of receiving *official* civil defense instructions, information, and news.

When attack is coming, here's *how* and *where* you can find out where to go and what to do.

REMEMBER!

CONELRAD

WILL BROADCAST:

PREATTACK information and instructions. Where to go. What to do. When to do it.

EVACUATION instructions, directions, routes, and assembly areas.

WARNING when to take shelter. When attack is imminent. When it is safe to come out of shelter.

FALLOUT information and instructions. Where fallout is expected. When it is expected. When it is safe to return to an area or come out of your shelter after the danger of fallout has passed and the radioactivity has dropped to safe levels.

NATIONAL INFORMATION of importance to the whole country. Broadcasts of vital interest to you from the President and other National and State leaders.

U. S. GOVERNMENT PRINTING OFFICE : 1956—O-383544

For sale by the Superintendent of Documents,
U. S. Government Printing Office, Washington 25, D. C.
Price $3.25 per 100 copies

IF YOU ARE LISTENING TO ANY RADIO OR TELEVISION SET WHEN THE ALERT SOUNDS, YOU WILL HEAR A MESSAGE LIKE THIS:

"We interrupt our normal program to cooperate in security and civil defense measures as requested by the United States Government . . . This is a CONELRAD radio alert . . . Listen carefully: This station is now leaving the air. During the CONELRAD alert there will be no FM or TV programs. The only program on the air will be on your standard radio at 640 or 1240 kilocycles, beginning after a short period of silence. Be patient. Tune the dial of your standard radio receiver to 640 or 1240."

If you are NOT listening to a radio or TV set when this announcement is made, you will know the CONELRAD system has gone into operation when you hear the civil defense sirens or attack warning signals . . . Tune your AM (Standard) radio immediately to the proper dial setting—640 or 1240—and listen for the official broadcast.

REMEMBER: When an alert sounds, ALL NORMAL BROADCASTING WILL CEASE.

After a short period of silence, CONELRAD stations will return to the air at 640 or 1240 kilocycles on your standard AM radio. This off-the-air period is due to necessary broadcasting-equipment changes. Its length will vary for different areas. Contact your local Civil Defense Director for the approximate time lapse in your area.

WHAT IS CONELRAD?

The system is officially entitled "Plan for CONtrol of ELectromagnetic RADiation"—CONELRAD for short . . . It is a system devised by the broadcasting industry and the Government, working together to bring you official information and civil defense instruction in times of emergency.

WHY DO WE NEED CONELRAD?

Without it, enemy bombers could tune their direction finders to a station broadcasting in a target city and "beam" right in to their targets. To prevent this from happening, all stations *could* go off the air entirely, as they did in World War II—but at the cost of denying vital civil defense information and instructions to people in imminent danger of attack. CONELRAD stations *can* continue to operate, even under actual attack conditions, and still deny enemy bombers this navigational aid!

HOW DOES CONELRAD WORK?

When CONELRAD goes into operation, *all* stations first sign off the air with a standard alert announcement. The stations of the CONELRAD system then reduce power and change their broadcasting frequency to 640 or 1240 kilocycles. Then they return to the air.

CONELRAD stations in each city join in a "cluster" of three or more stations. These cluster stations broadcast a single program. One station is on the air for only a few seconds, then another cluster station continues the *same* program.

You will hear a *continuous* program without interruption, although the volume may vary as the program is switched from a station near you to one at a more distant point. However, by turning the volume up until you can plainly hear the weakest station, you should always receive a continuous and uninterrupted program.

This switching makes a bomber direction finder swing erratically so that it cannot "fix" or "home" on a single station.

With many CONELRAD stations in operation, all on 640 or 1240 kilocycles, this completely confuses the "homing" capability of the finder. Tests conducted by our own Air Force have proved that the CONELRAD system eliminates broadcasting as a navigational aid.

TELEVISION AND FM (FREQUENCY MODULATED) BROADCASTING STATION

WHAT ELSE YOU SHOULD KNOW ABOUT CONELRAD:

First, CONELRAD is the only safe broadcasting system yet devised to keep you informed of important civil defense instructions and news without helping enemy bombers find their targets.

Second, CONELRAD may be used in one of two different ways, depending on your location:

1. CONTINUOUS METHOD:

If you are in or near a large city, you will hear a continuous program of civil defense instructions and reports at 640 or 1240 kilocycles, or both, during the CONELRAD operation.

2. ON-OFF METHOD:

In some smaller communities where only one station is in the CONELRAD system it will broadcast at either 640 or 1240 kilocycles for a short period, then be off the air for a period of minutes. This on-the-air, off-the-air pattern will continue until the end of the alert.

NO BROADCAST:

Due to the reduction in transmitting power and the use of only two frequencies (640 and 1240 kc.) throughout the Nation, interference between stations may limit coverage obtainable in some suburban and rural areas. If you are in such an area, your radio may go silent or interference may prevent you from distinguishing the civil defense message being broadcast. This problem is being studied jointly by the Government and the broadcast industry.

WHAT CONELRAD MEANS TO YOU

CONELRAD will give you civil defense instructions and information that may mean the difference between life and death for you and your family:

WARNING CONELRAD will go into effect simultaneously with the first warning from the Air Defense Command. The surest, safest way to *know* what to do when you hear the sirens is to tune to your CONELRAD station at 640 or 1240 on your AM radio dial.

SHELTER Your local Civil Defense Director may order you to take shelter if immediate attack is threatened. CONELRAD can bring you instructions in your shelter. Because local power may fail, a battery-operated portable radio with an outside aerial is your best insurance. On many new sets the CONELRAD frequencies of 640 and 1240 are marked. Find out which frequencies will be used in your city. It may be both. If your set isn't marked, mark it *now!*

EVACUATION Your Civil Defense Director may order an evacuation of your city when attack threatens. The order will come to you by CONELRAD as well as the public outdoor warning sirens and from police and civil defense officers. CONELRAD will supplement warnings with full instructions. If you evacuate by car, keep your auto radio tuned to CONELRAD for the latest instructions. Information on routes, assembly areas, and the imminence of attack can be flashed to you instantly as you travel. Although the reduced transmitting power of CONELRAD stations may make reception erratic *beyond* 15 miles, reception within this distance should cover most evacuation routes and reach into most assembly areas. Plans for public emergency broadcasts locally along evacuation routes and the fringe areas are being developed.

FALLOUT Because of the heavy amount of radioactive fallout produced by large atomic and hydrogen bombs, your Civil Defense Director may order you to take shelter or evacuate an area even though your own city may not have been bombed. Even if you have just evacuated from your city, you may have to take shelter or evacuate to another area out of the fallout pattern. CONELRAD will bring you this vital information.

S WILL REMAIN OFF THE AIR FOR THE DURATION OF THE ALERT!

An Emergency Alert System for the Digital Era

by Charles W. Rhodes, 09.17.2008

Prelude: Before World War II began, it was clear that some sort of Emergency Alarm System involving radio would be needed soon. RCA responded by developing a special purpose radio tube, its 0A4-G, a gas-filled Thyratron with a cold cathode for extremely long life and requiring no standby power at all. This tube could detect an unmodulated RF carrier (which would be impressed on the power lines) to activate a relay that would then supply power to a radio from Europe into the United States.

RCA Tube Handbook HB-3, in Volume No. 1 for the 0A4-G shows the circuit on a data sheet dated April 20, 1938. RCA Receiving Tube Manuals up to and including RC-14 say of the OA4-G: "Because the discharge can be initiated with so little (RF) energy it is practical to obtain remote control of line-operated electrical devices by means of an electrical impulse generated at radio frequencies and transmitted over the same power line." This tube is shown in Fig. 1.

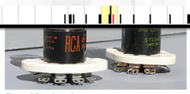


Fig. 1: RCA relay tube

To my knowledge, no consumer radio receivers were built with this tube to alert the household of an impending air raid. However, I believe this tube was used in Marine Radio Receivers, which continuously monitored the 500 kilocycles per second International Marine Distress Frequency. Such receivers would have been of the "Tuned Radio Frequency" type with many stages of RF amplification. The output of the last RF amplifier would have been applied to the starter anode of the 0A4-G relay tube which would activate an alarm so that human operators could determine the bearing to the stricken ship and render assistance. My evidence for this is the fact that I have in my collection a Sylvania brand type 0A4-G with USN markings (see Fig. 1). This would be the first application of radio broadcasting to *automatically* provide an alert to an emergency.

However, in 1917, Major Edwin H. Armstrong invented the superheterodyne radio receiver topology to detect the approach of enemy airplanes by picking up electrical noise radiated by the airplane engine's ignition system. That scheme didn't work, but his invention did work and still remains the basic topology of all radio and TV receivers. Emergency alert systems really go way back.

Fig. 2: A CONELRAD compliant receiver

FAST FORWARD, ENTER CONELRAD

Aeronautical technology had advanced during World War II to the point where a hostile nation's bombers could cross the Atlantic and bomb our cities. This concern led to the CONELRAD (Control of Electromagnetic Radiation) system in the late 1940s. Consumer radio receivers carried a Civil Defense symbol or a triangular mark at two places on their dial, one at 640 kc and the other at 1240 kc. Fig. 2 is a CONELRAD compliant receiver.

The concept behind CONELRAD was to deny enemy bombers any ability to use radio broadcast signals to navigate to their targets by means of radio direction finders which had been used successfully in World War II at Pearl Harbor. The enemy bombers would not know which transmitter was being located by radio direction finders. Broadcast transmitters on-air were to be switched on sequentially, "transmitter hopping" to further confuse the approaching enemy aircraft.

The CONELRAD system was ultimately replaced by the Emergency Alert System (EAS) which applies to all broadcast signals; AM, FM and analog TV and soon DTV as well. The purpose of the present EAS is to provide a means by which the president could address the public from the White House of an impending or actual attack by the armed forces of a hostile nation by aircraft or inter-continental missiles. As it is tested frequently it may tend to reassure the public that there is an emergency alarm system in place and known to work in the event that it is needed, but this testing is an annoyance to both broadcasters and the public.

More to the point, persons not watching TV or listening to a radio could not be warned of any impending attack, and moreover, such a warning by the president would be a national warning. While it is difficult to imagine that every population center would be simultaneously under attack, such a warning would needlessly scare multitudes. That large numbers of people can be terrified by a radio broadcast was shown in 1938. Remember the stampede to evacuate New York City when Orson Wells dramatized "War of the Worlds" on the CBS network? I remember this event, which did not scare my father until he heard that the Martians had landed near Princeton, *his* college.

The Cold War ended almost 20 years ago so any threat of bomber or missile attack by a hostile nation is now moribund (dead). But still, broadcasters have to carry on these tests while the nature of threats has changed radically from intercontinental warfare to natural disasters which are appearing with increasing frequency and severity. So far only New York and Washington, D.C., have been attacked by terrorists. But the point is that the present dangers we face are all local in nature so a nationwide alerting scheme is out of step with the realities of this century.

Natural disasters are a reality nearly everywhere. Our West Coast, Alaska, and Hawaii are subject to tsunamis, earthquakes beneath the ocean which may create devastating tidal waves. Earthquakes from the fault lines beneath California and Alaska are a closely related danger. There are other fault lines beneath our southeastern states. Our East Coast and Gulf Coast are frequently visited by hurricanes. Remember Katrina? Tornados are a fact of life for people living in the Midwest. Floods are a danger anywhere a river flows. Forest fires have become more frequent and more devastating in our western states recently. Solar flares can disrupt not only communications, but also electrical utilities. The last big one was on Nov. 13, 1960. The next "big one" is due late in 2010. So far the nuclear power plant incident at Three Mile Island, near Harrisburg, Pa., has been our only nuclear accident, but how long will our luck hold? What is needed is an EAS which can alert the threatened populace while not scaring the entire nation. Our present EAS cannot do this, but a well designed Digital EAS could over our DTV

a header which identifies the packet contents, and more specifically, how this data is to be linked with other data to compose a picture, or sound or other data. For example, all receivers located in a given (five number) ZIP code would respond to a header intended for those receivers located within that ZIP code. To be more certain that a given receiver is actually being addressed, the same ZIP code might be re-transmitted three times consecutively. Only if this ZIP code is received three times consecutively, would the receiver do anything with the emergency message contained in the data packet. This should make false alarms nearly impossible.

City Deliveries				
	98661	18,183	1,396	19,589
	98665	9,797	934	10,731
	98685	4,183	94	4,277
	98686	3,138	108	3,246
				37,843

Table 1: ZIP Codes in Vancouver, Wash.

Let us see how this would work in the real world. I live in Vancouver, Wash. Table 1 gives the ZIP code for my city/state and the population served by each ZIP code.

These five ZIP codes address the 37,843 mailing addresses in this medium size city. The first two digits are my state code and the three remaining digits are specific to my community. As there are only 50 states, many unused ZIP codes exist. These might be used to denote regions of a state. For example if the natural disaster is a tsunami, all ZIP codes on the Pacific Coast of Washington State (and also Oregon) should be warned to evacuate or seek higher ground immediately. If the warning is about a hurricane, ZIP codes in its predicted path should be warned first. The same applies to floods. In my case, I am near the Columbia River so only ZIP codes along that river would be sent. The Columbia River is the border between Oregon whose ZIP codes are 97XXX so only those 97XXX and 98YYY ZIP codes along the Columbia River should be broadcast.

Who would decide which ZIP codes are to be warned and when, and which governmental entity is responsible for issuing such warnings? I believe that this is a governmental function, not a broadcaster responsibility. Each broadcaster would transmit such warnings, with their ZIP code-based headers immediately upon being alerted by this governmental entity. Government being what it is with its multiple layers, those details need not concern us, however, such warnings and their headers must be protected against hackers or terrorists intent on destroying the credibility of this digital EAS so that its messages will be ignored.

What happens when a warning is transmitted to my ZIP code? First, my receiver will store the received ZIP code to verify that the warning header is identical in three consecutive periods, and not just an error which could not repeat three times consecutively. If the received ZIP code is mine, the receiver has two possible actions to pursue *immediately*:

If the receiver is not displaying pictures the household may be sleeping and must be awakened immediately. Both audible and visual alarms would be activated. As the receiver might be "muted," it must be de-muted and made to emit a suitable audio alarm loud enough that it will awaken anyone in the residence or business no

This addressable EAS can be implemented in software so this feature would have a negligible effect on the cost of future DTV receivers. Therefore there is no reason why all receivers manufactured after the details have been worked out should not be required to provide this EAS feature. Existing DTV receivers and those in the "pipeline" cannot have new software downloaded into them. This is also true of most of the 20 million or so DTV downconverters being subsidized by the federal government. I submit that DTV downconverters are so inexpensive that they can be readily replaced. Perhaps software-downloadable DTV converters can be subsidized as is being done with the first generation of downconverters.

I have covered Digital EAS in previous columns beginning in October 2005 and in January and February 2006. Go to www.tvtechnology.com and search for Digital EAS.

Next month, I intend to write about mobile and portable (battery operated) DTV receivers with EAS.

FORUMS

- AT&T-T-Mobile Deal-Any effect on the FCC's National Broadband Plan?
- Are you going to the NAB Show?
- Decklink Studio and Sony 25 VTR
- Watching TV at slower speed for people hard of hearing
- Auxiliary device compatibility with DTV
- Comcast's NBC Deal
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- Serious Stuff
- This Just In...
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OTHER DIGITAL TV STORIES

Update: Testing Interference to GPS by LightSquared Signals

Sign-off for conelrad

Friday, Jul. 12, 1963

Back in 1951, when the U.S. began to worry about Russian-atom armed bombers, somebody had a notion that the invaders might steer by the crisscrossing waves of U.S. commercial broadcasting stations. Probably Russian navigators were never so helpless as that, but an official system, Conelrad (for Control of Electromagnetic Radiation), was set up to foil them. Under Conelrad regulations, all regular broadcasting would go silent during an attack, while stations going on and off the air on two special frequencies, 640 and 1240 kc., would stand ready to give instructions and comfort to the quaking population.

Conelrad continued for nearly twelve years at considerable cost in money to the Government and nuisance to the broadcasters while improved navigation methods ma[illegible] Age. Then Russian bombers themselves became a minor menace compared with ballistic missiles, which can strike a few minutes after the first warning and are steered by inertial guidance systems that need no information from U.S. broadcasters or any other external source.

Last year the Department of Defense at last decided that Conelrad had long outlived its fractional usefulness. But it seemed to have a charmed life, and not until last week was it formally declared obsolete. On Aug. 5 it will be replaced by a new Emergency Broadcast System, which, during an attack, will use all AM stations that are still in working condition to send a single program of orders and solace to those citizens who are still alive.

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9. Punishment for the Shoe Thrower Puts al-Maliki in a Spot
10. France Shrugs as German Takes over *Michelin* Guide

Most Emailed

"I will fight this every step of the way."

ROD BLAGOJEVICH, Illinois Governor, in his first public statement since his arrest on federal corruption charges last week. Blagojevich disputes claims that he intended to receive payment for appointing a replacement to President-elect Barack Obama's Senate seat

More Quotes »

CNN Headlines

- Data recorders may yield vital clues in Denver
- Ice, snow create havoc, and more is on the way
- Another storm set to pound California

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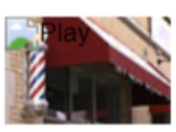

Video: Obama's Chicago - Part 2

This is the Broadcast History section of
The Broadcast Archive

Maintained by:
Barry Mishkind - The Eclectic Engineer
updated 10/9/12

What was Conelrad? EBS? EAS?

These are systems for alerting the public to emergency situations.

CONELRAD

Conelrad (CONtrol of ELectronic RADiation) was set up in **1951** to provide warnings to the public during the Cold War. Upon alert, most stations would go off the air. Each remaining station was to move to either 640 or 1240 kHz, and alternate with other such local stations, supposedly so no enemy Direction Finding equipment could lock onto locations in the US. Or course, most stations were not really that far apart, in air miles, so it was not a very useful system. Actual activations were apparently very few. (IF you have a story about a Conelrad activation, please share it.)

Conalert II - a professional Broadcast Receiver
Courtesy of Dennis Switzer at KKTY, Douglas, WY

Model DS-9660B Conelrad Receiver serial 3127
Manufactured for Motorola Inc by
Communications & Electronics Div by Multi-Products Co.
Courtesy of Charles Ring, WPIC

Even Ham operators were required to shut down in a Conelrad alert. One alarm, the Heathkit Conelrad alarm unit is located at: http://www.heathkit-museum.com/ham/ca-1.html (This could be used to automatically turn off the transmitter of a monitoring station.)

- - - -

Phil Alexander recalls: Radios of the late 50's and early 60's had the "CD" triangle in a circle emblem at 640 and 1240, and late one night I spent 2 or 3 hours turning a DA station on 1550 into a non DA on 1240 because about 9 PM EST one Saturday night in October '62, the White House seized all the wires and sent a message that all ConelraD authorized stations should be prepared to begin ConelraD operations at, or at any time after, 10 AM the following morning. I tested on 1240 during the experimental period, marked all the strap points and adjustments, put the station back on 1550, left a note for the morning guy to call me if an alert came through and went home (5 minutes away) and went to bed about 3 AM. The sun came up, the Russian ships on the way to Cuba turned around, and the 1240 crystal was never used again.

EBS

To replace Conelrad, the EBS (Emergency Broadcast System) was put into place in **1963**. Originally as outlined, stations were to test weekly. They were supposed to set off "carrier detect" receivers by the following sequence (As Conelrad receivers operated on the "loss of carrier" principle, they were still used for that purpose with the EBS program.):

1. turn their transmitters off for 5 seconds.
2. turn their transmitters on for 5 seconds.
3. turn their transmitters off for 5 seconds.
4. turn their transmitters on.
5. broadcast a 1000 Hertz tone for 15 seconds to alert other stations.
6. broadcast a "test" message so the public understood what was going on.

Ball/Miratel EBS receiver
This unit responded to carrier breaks
Courtesy of William Barnett, WFIF

Among other unintended consequences, during lightning storms dozens of false "alarms" were often initiated. And there were many stories of stations going off, and suddenly founding out through the "EBS Stress Test" that they couldn't get the transmitter to come back on!

Worse yet, due to a slipup (supposedly in NORAD headquarters) on February 20, 1971 at 9:33 AM EST, during a regular weekly test period, a false alert was sent out. The story was that the "wrong tape" was put in the teletype machine. Many stations, including some key primary stations, either ignored the alert or found that their staff didn't know what to do.

One account of interest about that strange day had pictures of the teletype paper, found here. Audio is here from WOWO. The report in Wikipedia even has a name for the operator.

The bureaucrats, after a year or so of talking and "testing" decided to "upgrade" the system to provide "better and more accurate handling" of alert receptions. In addition to other procedural changes, the alert signal was changed to a dual-tone to reduce "false alerts." EBS, Version 2 was put into operation in about 1976.

TFT 760 Two Tone EBS Encoder/Decoder

Gorman-Redlich EBS monitor

A web page with more information on the EBS system, including samples of the scripts and authentication lists, can be found at http://www.akdart.com/ebs.html

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EAS

In **November 1994**, the EAS (Emergency Alert System) was approved by the FCC, with operations to begin **January 1, 1997**. Using digital signaling, the EAS was to permit sending more than an alert, actual information could be sent, printed out, and rebroadcast on command.

TFT Model 911 EAS Encoder/Decoder

EAS - CAP

What might be considerd EAS V 2.0 had a deadline of **June 30, 2012**, when all stations were required to have a receiver that could accept messages from the national IPAWS OPEN CAP server at the FEMA.

TOMORROWLAND

ALERT A FRIEND! LET THEM KNOW ABOUT THIS PAGE

You have tuned into CONELRAD at 640 & 1240 AM on your Internet dial. Please punch this station into your bookmark file and visit us often. For unlike the old CONELRAD, we're available 24/7 and always providing interesting new content. You may be asking yourself what WAS CONELRAD? CONELRAD was the first national Emergency Broadcasting System outlet that was started under President Harry Truman during the early Cold War. CONELRAD was an acronym for CONtrol of Electronic RADiation. The theory behind the original CONELRAD was that if radio stations shifted their broadcast signals between 640 and 1240 it would be more difficult for Soviet bombers to target America's cities. This service was replaced by the less preposterous Emergency Broadcast System (EBS) in 1963. Of course, today we have the Emergency Alert System which emits that odd tone that sounds like a broken fax machine. What IS CONELRAD? CONELRAD is a site devoted to ATOMIC CULTURE past and present but without all the distracting and pedantic polemics.

CONELRAD is the creation of writers who grew up in the shadow of the BOMB and all its attendant pop culture fallout. We wish to share our collected interest, experience and obsession with this strange era and thereby provide as much information as possible to the public. This is not to say we're living in the past! The Day After Trinity is now and forever more and we will reflect that reality here. From apocalyptic dirty bomb scenarios to the Russians and Chinese reigniting the space race, CONELRAD is always on the Eve of Destruction. Watch our Alert ticker on the top of our main page to stay informed of the latest CONELRAD activity.

In addition to our own writing on all things ATOMIC, we aim to provide a comprehensive clearinghouse of atomic links. There is a lot of material out there and we will continue to update this section frequently. Furthermore, we extend an open invitation to those of you out there who share our passion for Atomania to send us your suggestions and submissions.

You are now welcome to open a nice cold can of Emergency Drinking Water and proceed.

Control of Electronic Radiation CONELRAD

President Truman established the CONELRAD [CONtrol of ELectronic RADiation] system in 1951. to provide emergency alert to the public. Under this first national alerting system in the event of a Soviet attack on the United States, all commercial radio stations would cease normal operation, in order to prevent Soviet bombers from homing in on their targets by using specific radio commercial radio stations as navigation beacons. Instead, selected CONELRAD stations would broadcast on either 604kHz or 1240kHz to inform the public about emergency measures. As part of the system it was obligatory for all radios sold after 1953 to have the CONELRAD frequencies 640/1240 kHz marked with small triangles on the dial. The triangles were referred to as CD marks, for Civil Defense. The marks on the radio dial were to make finding the frequencies easy. This requirement was dropped, when the CONELRAD system was replaced by the Emergency Broadcast System in 1963. By the early 1960's the development of Soviet missiles had made the CONELRAD system obsolete.

Sources and Resources

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http://www.fas.org/nuke/guide/usa/c3i/conelrad.htm

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Updated Wednesday, April 29, 1998 7:46:18 AM


55 AM
60
65
70
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90


5 5
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16

In Case of Attack!

TUNE YOUR AM RADIO DIAL TO

OR

640 1240

FOR OFFICIAL INFORMATION

CONELRAD

FEDERAL CIVIL DEFENSE ADMINISTRATION


CONELRAD

Eerie, Creepy Look at Cold War Culture - NEW YORK TIMES

GODFREY
ULTIMATE PUBLIC SERVICE ANNOUNCEMENT

CONELRAD

640 ▲ 1240

CONELRAD

SIGN UP NOW! DUCK-COVER

CONELRAD ALERT: Anti-Baez: The Ballad of Janet Greene

Amazing Anti-Communist Folk Collection co-produced by CONELRAD!

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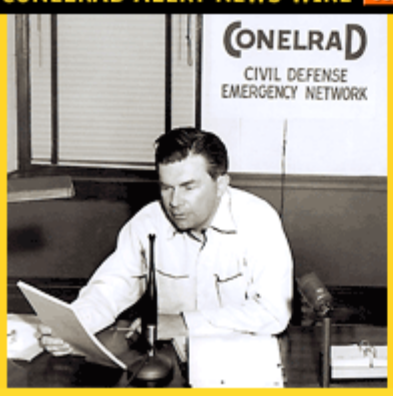
And don't forget our Flickr image galleries

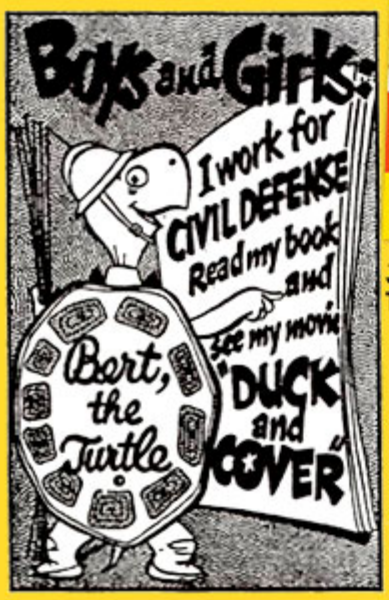
CONELRAD ALERT NEWS WIRE XML | ATOMIC HYGIENE XML | CONELRAD CAFE PODCAST POD



Database connection failed. Please check your config settings.

Warning: Cannot modify header information - headers already sent by (output started at /home/plumbob/public_html/kahn/db/db.mysql.php:222) in **/home/plumbob/public_html/kahn/inc.lib.php** on line **265**

DUCK AND COVER



COMPLETE PRODUCTION HISTORY
THE 'CITIZEN KANE' OF CIVIL DEFENSE FILMS

JANET GREENE:
THE 'ANTI-BAEZ'

YEARS-IN-THE-MAKING MUSICAL MANHATTAN PROJECT
ATOMIC PLATTERS
BE SURE & VISIT OUR ATOMICPLATTERS.COM
CONELRAD & BEAR FAMILY RECORDS: 5CD/1DVD BOX SET

ATOMIC SECRETS

SIRENS, DOG TAGS & PS 11 ATOMIC TESTIMONY FROM LAURA GRAFF ☢ ATOMIC HONEYMOONERS 1959 LIFE MAGAZINE FALLOUT SHELTER COUPLE ☢ SWINGING 1970's EBS JINGLE ☢ OPERATION ALERT BUFFALO ☢ IF THE BOMB FALLS 1961 CIVIL DEFENSE LP ☢ THE LAST RADIO NETWORK LONG WAVES FROM THE COLD WAR ☢ LISTEN TO THE AUDIO ARCHIVES ☢ INSIDE A COMMUNIST CELL SHOCKING TESTIMONY - 1961 KEY LP

ATOMIC PLATTERS

☢ FALLOUT SHELTER: 1962 LOST ATOMIC CLASSIC SOVIET AMERICA: THE FEAR OF WHAT MIGHT HAVE BEEN ☢ SYRACUSE: IT COULD HAPPEN THERE ☢ CD REMINDER: IN TIME OF EMERGENCY ☢ GOING POSTAL: USPS SAFETY NOTIFICATION CARD ☢ AUTHENTICATE!: TITAN MISSILE MUSEUM TOUR ☢ FIFTY YEARS ON: THE REDEMPTION OF INVASION USA ☢ ATOMIC YELLOW PAGES: TRY OUR ATOMIC COCKTAIL