# Chalk River Region Nuclear Emergency Plan
# Exercise
# 2003 - June – 10

Renfrew County ARES and the Renfrew County Amateur Radio Club provide alternate communications for the Chalk River Nuclear Emergency Plan (CRRNEP). Until recently, all communications were conducted on 2 Meter voice with formal and informal messages. Voice messages have some drawbacks. One is the ease of eavesdropping by the press, and another is the slow speed of accurate message transfer. Both of these drawbacks can be helped by the use of packet for messaging. It is unlikely that the press would be equipped with packet, and packet transmissions can be faster and more accurate than voice.

The first problem we faced, of course, was financial. We couldn't get much funding from the Province or the Emergency Plan. Fortunately, AECL donated 6 older laptops to the cause. Some are 486's and some Pentium 90's. We searched for used TNC's, but there weren't many to be found. We chose to use BayCom modems built from an article in Jan. 2000 QST entitled "An MX614 Packet Modem".

HTX-202 hand-helds with speaker-mikes, and AC power supplies had been purchased for each of the 7 centres involved in the CRRNEP. All but the Reception Centre were equipped with permanent 2 Meter antennas and coax leading to the radio room. To operate both voice and packet, we had to be able to switch quickly between modes. We accomplished this by building the modems into boxes with a 9 socket DIN connector on the back for the computer connection and connectors for the speaker-mike on the front along with connectors for cables to the '202 mike and speaker connectors. A switch on the front panel switches between the speaker-mike and the modem. The 3 priority channels on the '202 are programmed for the 2 local repeaters; VA3RBW and VE3NRR, and 145.01, the frequency we use for packet in the area. To change between packet and voice, the operator needs only to flick the switch on the front of the modem and rotate the '202 channel knob 1 or 2 positions.

Printers for the computers proved a problem. Since BayCom runs under DOS, a DOS compatible printer is required. This means a printer that will print a character when it's ASCII code is sent to the port. Most printers sold today are Windows printers and must run with a Windows driver. The old dot matrix type printer works well for BayCom.

The maximum distance between centres is about 50 KM between one of the Evacuation Centres and the Municipal Operations Centre (MOC), so to ensure reliable communications; we installed a node at the VA3RBW site (PTALEX). The node consists of an FT2600 and a KAM configured for 4 channels.

Our first test of the system during an exercise in 2002 was a mixture of resounding success and dismal failure. There were 4 centres operating for the exercise; The MOC and Evacuation Centre had perfect communications. It worked so well that the operators

at the Evac Centre were able to assist with non-radio activities and when they heard the printer operate, they could rip the message off the printer, acknowledge, then deliver the message and go back to what they were doing. The Reception Centre (REC) and the Joint Information Centre (JIC) could not communicate by packet with the MOC at all. We were never able to say for sure what the problem was, but after endless testing, we have decided that reflections from the Laurentian Hills across the Ottawa River were causing distortion in the audio and preventing reliable reception of the packets. It seems that one must pick the right antenna location to avoid this problem, and that location changes day by day. Our fixed antennas on the centres don't lend themselves to changing positions! To solve this problem for the 2003 exercise, we added more nodes so if a station couldn't work through one, they could use another. We put a "The Net" node in Pembroke (PEM) and VE3DMJ (DMJNOD) and VE3IGN (CFBPET) had their personal stations operational as nodes.

For the June 10, 2003 exercise, we had 5 stations operational; MOC, REC, JIC, a different Evac Centre than 2002, and a station at the County Building. At each station, the operators improvised with their own equipment to provide 2 Meter voice, giving us simultaneous voice and packet. All stations could communicate by packet with at least one node. No stations required more than one node hop to get to any other station. The exercise scenario did not include a failure of the normal communications this time, so we did not get many messages to pass, but we had good success with those we did get. There was one glitch that we realized required a change in packet operating practice. The BayCom screens on all the computers were set up with 4 ports. Operators tended to make a connection on each port through a node to one of the other stations and leave the connection open. We ended up using all the node channels on some of the nodes, so when someone attempted to make a new connection, they got a busy reply. We realized that when a message is to be sent, a connection to the other station should be made through a node if necessary, the message passed, the acknowledgement received, then the connection terminated to leave the node channel free. If we had all the possible centres in use, this procedure would be very important. (We use nodes instead of digipeating to reduce the amount of packet traffic on the channel.) Another fix for this problem would be to increase the number of channels on the nodes if they have enough memory.

To pass a formal message, we use the "standard text" feature of BayCom. The following is a portion of the SCC.INI file for the BayCom program running on the computer at the JIC:

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; And here are the definitions of the standard texts mentioned above
;
st t \x JIC / Pembroke    \t
st c \xc P TALEX
st m \x\rARES Message Form -- MSG # \i
st n \rPrecedence   R\i
st o \rHandling Instructions  (HX)B 1\i
st p0 \rSent from the JIC located in Pembroke on \d \t
st p1 \rMessage:
st p2 \r----------------------------------
st p3 \rTo: \i
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st q \rSigned: \i
st r0 \r----------------------------------
st r1 \rWord count: \i
st e \xThis is an exercise message from the JIC / Pembroke at \t.

; The standard text "c" connects you to PTALEX if you press ALT-C from
; the terminal.
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The standard text is sent by typing <ALT> char, where char is the single letter after the "st" in the SCC.INI file.
i.e. <ALT> t will send **JIC / Pembroke 21:15**

\d inserts the date
\i suppresses the <CR> at the end of the line.
\r inserts a <CR>
\t inserts the time.
\x erases the line where the cursor is ( to avoid sending any text on that line)

To send a formal message, start with <ALT> m, and proceed down the alphabet to <ALT> r. The <ALT> m will leave the cursor at the #. Type the message number, then <ALT> n. The standard text will supply the <CR> to send the message number line and leave the cursor after the R for precedence. If the message is routine, continue by typing <ALT> o. If the precedence needs to be changed, backspace over the R and replace it with the new precedence before typing <ALT> o. Similarly down to <ALT> p. this will send lines p0 to p2 and leave the cursor at the To: line. After typing the To address, type a <CR>, followed by the message text. After the message text, type an <ALT> q to continue. This should be enough explanation to show how the whole message send works. If ECHO is ON, the message text will appear in the middle window and provide an opportunity to count the words.

Each station has a brief set of instructions describing the running and operation of the packet and BayCom system. One should be able to use the instructions to set up the station and get it operating without much previous experience.