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Supplementary Notes			
Abstract In December of 1998, Alberta Transportation & Utilities installed a low power FM radio broadcast transmitter near Valleyview along Hwy 43. The purpose is to demonstrate how a Highway Advisory Radio (HAR) system can aid in warning travellers of inclement road and weather conditions, and construction or maintenance activities. The tested system had a range of 8 km. The local maintenance contractor provided the personnel to record and update the messages. At the conclusion of the trial in April, the department had received positive reactions from the local municipality and from the local RCMP detachment. Some technical difficulties with the broadcast volume and a potential security breach through its dialup connection are identified as needing attention. Overall, it was a successful pilot and the author recommends that more permanent installations be considered, as well as a portable unit for testing with a moving construction/maintenance job. Applications for CRTC and Industry Canada approvals will have to be sought.			
Key Words Highway advisory radio system (HAR or HARS) Advanced Traveller Information System (ATIS) Road Weather Information System (RWIS)		Distribution Unlimited	
		Project Co-ordinator Rick Kowalik	

ALBERTA TRANSPORTATION AND UTILITIES

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HIGHWAY ADVISORY RADIO SYSTEM TEST PROJECT

1.0	WHAT IS A HIGHWAY ADVISORY RADIO SYSTEM (HARS)?	2
2.0	TEST PROJECT BACKGROUND	2
2.1	TEST PROJECT LOCATION	3
2.2	TEST PROJECT DETAILS	4
2.3	TEST PROJECT OBSERVATIONS.....	6
3.0	SYSTEM LICENSING ISSUES.....	8
4.0	OTHER HIGHWAY ADVISORY SYSTEM USERS.....	8
5.0	SYSTEM COST, FEATURES, AND SPECIFICATIONS.....	9
6.0	OTHER AVAILABLE HARS SYSTEMS.....	9
7.0	RECOMMENDATIONS	11

APPENDIX AA@

PROJECT FEEDBACK HIGHWAY ADVISORY RADIO SYSTEM

APPENDIX AB@

APPLICATION FOR CRTC LICENSING EXEMPTION

APPENDIX AC@

SAMPLE BROADCAST SCRIPTS

APPENDIX AD@

PORTABLE FM TRANSMITTER INFORMATION

HIGHWAY ADVISORY RADIO SYSTEM TEST PROJECT

1.0 WHAT IS A HIGHWAY ADVISORY RADIO SYSTEM (HARS)?

The Highway Advisory Radio System (HARS) is a low power radio station which can be used to provide the travelling public with the most current information related to local road conditions, closures, or delays. Motorists will receive this travel advisory information by tuning their FM car radios to the proper predefined frequency. The information being broadcast on the HARS can include any of the following points of information:

- U winter road condition, ie: snow cover, blowing snow, black ice, etc
- U warn motorists of possible hazards, road delays or detours
ie: snowplow operations, survey/testing crews, construction or maintenance crews, wildlife etc.
- U road closure or delay due to an emergency situation,
ie: vehicle accident, forest fire, chemical spill, weather etc.
- U advise motorists of future activities that may result traffic disruptions,
ie: due to construction and/or maintenance activities.
- U advise motorists of speed limit changes which may be temporary.
ie: safety initiatives, ie: Buckle Up, Drive Safely, Think and Drive, etc.

A properly operated HARS should have a positive impact on safety by increasing driver awareness and reducing frustration.

2.0 TEST PROJECT BACKGROUND

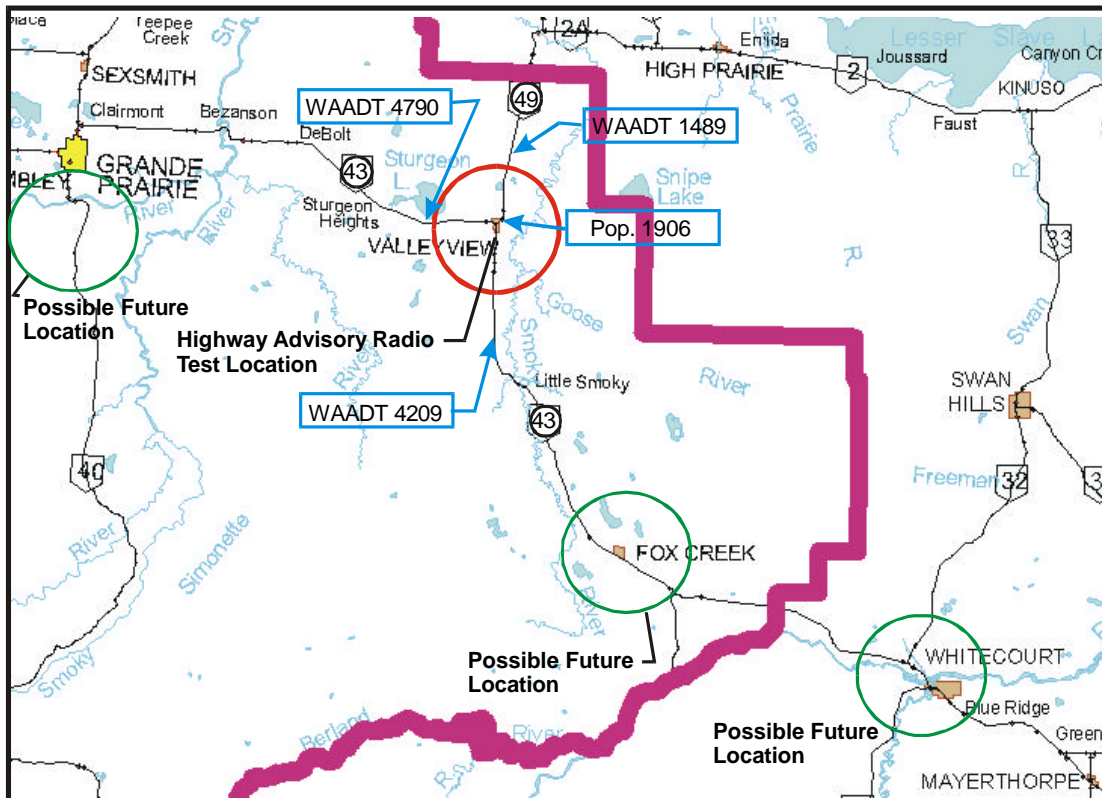
The concept of a Highway Advisory Radio System (HARS) was introduced to the departments Maintenance Process Management Group (MPMG) by Total Point Inc. Total Point is a Whitehorse, Yk based company which manufactures and distributes various use, low power FM radio systems.

After preliminary discussions it was decided that the idea of a Highway Advisory Radio system had merit. However, considering that the system was untried in Alberta, it was felt that more information and possibly the establishment of a test site was required. Rick Kowalik of the Technical Standards Branch was asked to coordinate the test project on behalf of the MPMG.

Total Point Inc. was approached and a proposal was made asking them to provide a system on loan for testing purposes. Total Point agreed to provide, free of charge, a 5 watt InfoPoint 2000VRA system complete with power supply and antenna.

2.1 TEST PROJECT LOCATION

It was decided to test this system in a relatively isolated area where traffic volumes were significant and traffic safety was a concern. We also wanted to select a location where the HARS system would essentially be the only source of current information available to the travelling public.



Based on discussions with members of the MPMG, Hwy 43 was selected as the test highway. It was also felt that the Valleyview area would be the logical location for a permanent installation. With the high level of construction activity being planned for Highway 43 over the next few years, the HARS may help to reduce driver frustration caused by construction delays.

The installation at Valleyview will provide current highway condition information for traffic that is,

- U northbound on 49 to Donnelly,
- U westbound on 43 to Grande Prairie,
- U southbound on 43 to Fox Creek.

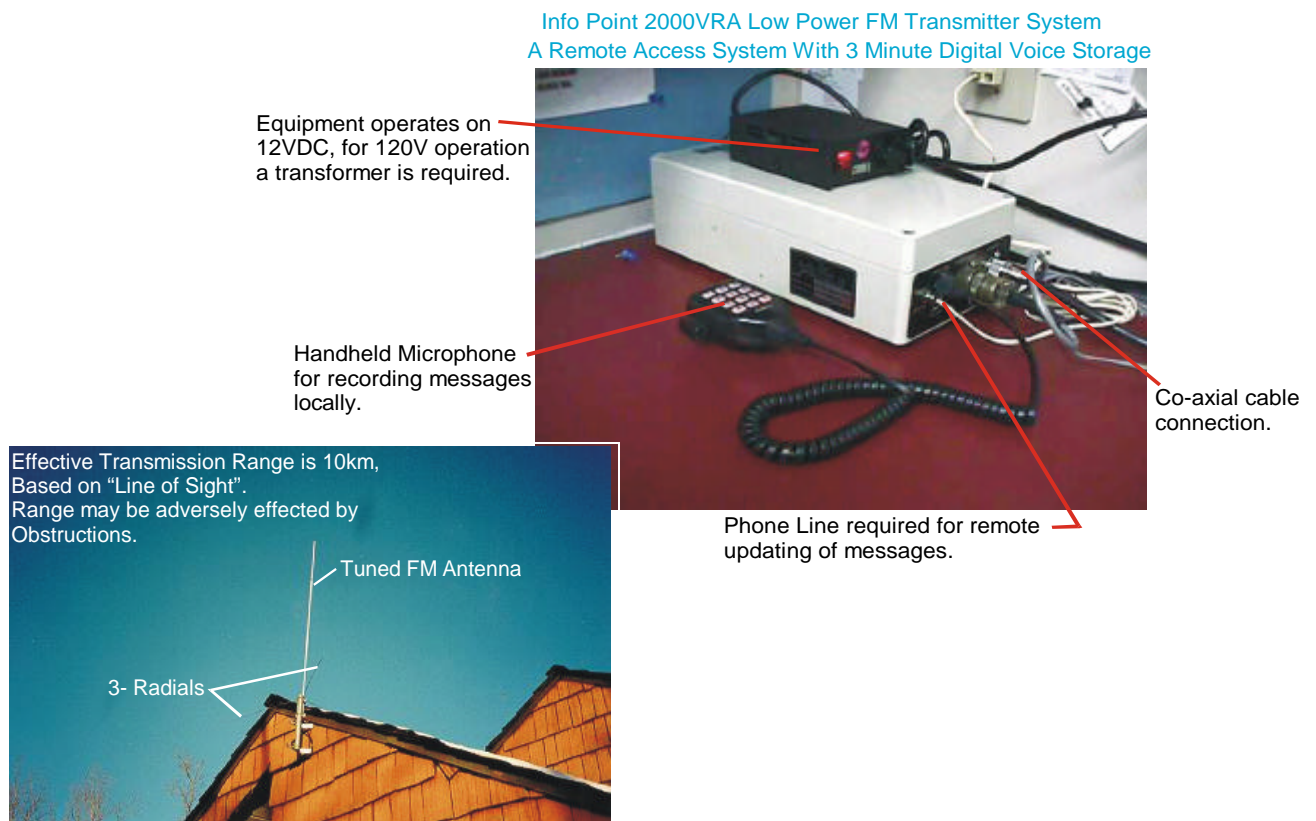


2.2 TEST PROJECT DETAILS

The concept of a HARS test site being set up in the Valleyview area was discussed with Darrell Camplin (Operations Manager), Bruce Henderson (MCI) and Carl LaPrairie of the LaPrairie Group. The concept of a Highway Advisory Radio System was very well received by all parties including Carl LaPrairie who had originally referred Total Point Inc. to the department.

Based on its geographical location and close proximity to the highway, the Valleyview Rest Area was selected as the equipment installation site. After completing a detailed FM frequency survey, a frequency of 105.5MHz was selected for the purpose of our test. The radio hardware was installed in a secured room within the Rest Area and the antenna was installed on the exterior of the building. To facilitate the remote access features, a dedicated phone line was installed to the unit.

For the purpose of our testing, AT&U assumed all costs related to the installation of the equipment and signing. Total AT&U costs for this test project are estimated to be \$1,500 exclusive of staff time. The LaPrairie Group had volunteered to assume the responsibility of updating the broadcast information.



It was agreed that for the purpose of this test project, LaPrairie personnel would update the broadcast message at least once a day or as conditions changed. Bruce Henderson

would monitor the broadcasts for accuracy, he would also monitor and poll the public for their comments. (For Sample scripts see Appendix "C")

Signage was erected in 2 locations on highway 43 to advise the public of the Highway Advisory Radio System. For the purpose of the test project, signage was installed facing southbound traffic on Hwy 43 at the Valleyview limits and facing northbound traffic on Hwy 43 approximately 6kms south of the rest area.



2.3 TEST PROJECT OBSERVATIONS

Prior to uncovering the public information signing, a generic test message was recorded and the system was ~~Aburned~~ in@ for approximately 3 weeks. The purpose of this ~~Aburn~~ in@ period was to verify the equipments operating integrity and to ensure that conflicts in broadcasting frequency would not occur. A few equipment problems did occur during this period requiring that the unit be returned to Total Point for repair.

A replacement system was subsequently installed. Signing was uncovered in early December and the system was placed into full operation on December 8, 1998. To date, the system remains operational however the test is scheduled to end on April 2, 1999. The radio unit performed reliably with no system failures occurring during the test period.

The day to day updating of the system was handled by Dorothy Russell of the LaPrairie Group. LaPrairie's equipment operators provided Ms. Russell with the current road conditions and in turn Ms. Russel would remotely update the broadcast message. Ms. Russell is based in Grimshaw which is approximately 160 km from Valleyview.

Public reaction to the system was extremely good. Positive reviews were received from the Valleyview Chamber of Commerce, the local RCMP detachment and the local school board on behalf of their bus drivers. Correspondence received has been included in Appendix AA@.

Some technical problems/issues raised during testing.

- ' During the ~~Aburn~~ in@ period, the units broadcast range was found to be approximately 5kms. In hopes of increasing the broadcast range, it was decided to increase the height of the antenna so that it would clear all obstacles on the roof of the rest area. By doing so we hoped to improve the line of sight factor. Shortly after raising the antenna the range actually dropped to less than 2 kms. Upon investigation a short to ground in the co-axial cable was discovered. The short was repaired and the system range improved to approx 8kms.
- ' System broadcasts could be heard on Hwy 43 west and south but could not be heard by traffic on Hwy 49. It is believed that the problem is related to shielding caused by a hill located between the rest area and Hwy 49. Local interference from the Town of Valleyview may also be a contributing factor to this reception problem.
- ' When in broadcast mode the system attaches a audio tone to the end of the broadcast message. Concerns have been raised about the volume of this ~~end~~ of

message@ tone. For some reason the volume of this tone is substantially higher than the volume of the message.

What compounds this problem is the fact that the broadcast volume of the system seems low. To compensate for the low broadcast volume, drivers are required to turn up the volume on their vehicle radios. When the vehicle=s radio is turned up, the louder end of message tone is almost ear piercing.

Neither the broadcast volume of the HARS message or Aend of message@tone is user adjustable.

- ' It was discovered that not all touch tone phones are able to make use of the remote access feature. Apparently some phones do not produce a tone that is of sufficient duration to allow the HARS unit to recognize it. This is not an issue with any cell phones.
- ' System security is a concern. Remote access features are not protected by any security access codes or passwords. Therefore, anyone who dials into the unit may disrupt the units operation. This is a critical issue. Because of this lack of security the unit=s phone number was not circulated to the AMA or within the community of Valleyview during the test period.

Ideally, you would like to advertise this number so that people outside the broadcast area can check road conditions before they begin their trip. For instance people from Grande Prairie or Edmonton may wish to check the current road conditions on Hwy 43 before making the decision to travel.

- ' For the purpose of this test project no special licencing was required however, CRTC and Industry Canada approvals and licencing will be required should this installation become permanent.

3.0 SYSTEM LICENSING ISSUES

Total Point has currently applied to Industry Canada to have this type of low powered FM system exempt from the licencing process. See Appendix AB for a copy of the exemption application. Until this exemption has been approved, any permanent installation of this type of system *will* require licensing. Licensing is not required if the system is used for emergency purposes or if the broadcast period is less than 28 days.

Licensing applications must currently be made to both Industry Canada and the Canadian Radio and Telecommunications Corporation (CRTC). If the installation is to be within 6 km of an airport, an Aeronautical Obstruction Clearance form must also be made to Transport Canada.

Under current regulations, Agovernment can not hold a broadcast licence, applications must be made in the name of an individual. This individual may in turn, hold the licence on behalf of a government department.

4.0 OTHER HIGHWAY ADVISORY SYSTEM USERS

' The Yukon Highways department have successfully been using these transmitters for approximately 5 years. Currently they have seven permanently installed transmitters and 2 portable ATalking Sign units. The permanent units are deployed on various highways throughout the north for use as ATravel Advisory Radio stations. The portable units are used to advise of summer construction/maintenance activities as well as for use in emergency situations.

Officials within the Yukon Highways department have noticed a significant decrease in the level of driver frustration when the HARS unit has been used to provide advanced warning of construction activity or delay.

' In March of 1998, Manitoba Highways installed 2 of the Road Advisory Radio Systems on the Trans Canada Highway.

' In January of 1998 the Ontario Provincial Police (OPP.) purchased a portable ATalking Sign unit which will be used to advise motorists of accident delays, or emergency road closures.

' In July of 1998 the Sault Ste Marie Police Service began using the portable SAR (Search and Rescue) unit. According to officials In Sault Ste. Marie, the system will be used in emergency situations such as toxic spills, ice storms and floods.

5.0 SYSTEM COST, FEATURES, AND SPECIFICATIONS

- ' The test system is a InfoPoint 2000VRA@system valued at \$6000.00 per unit, complete with power supply and antenna.
- ' The system can utilize any frequency within the entire FM Broadcast Band from 88.1 - 107.5 MHZ.
- ' Frequency selection is facilitated through an internal DIP switch array.
- ' Internal Digital Voice Recorder memory can store a broadcast message of up to 3 minutes.
- ' Message programming via external keypad or remote access via touch tone telephone or cell phone.
- ' 5 watts of output power which should provide approximately a range of 8kms.
- ' 120VAC or 12VDC operation.
- ' Users outside of the broadcast range can dial into the system to monitor the broadcast message.
- ' System meets Industry Canada Certification Specification RSS-153
- ' The system is to be operated in full compliance with Industry Canada and CRTC regulations and the Broadcasting Act. For the purpose of this test project no special licencing is required.

6.0 OTHER AVAILABLE HARS SYSTEMS

An Internet search was carried out and various radio communications firms and traffic supply distributors were contacted to see if other sources of this type of product were available. The results of my search revealed that there were no Aoff the shelf@packages that were comparable in price or performance.

Total Point was found to be the only Canadian firm with a field tested, Industry Canada approved system. Some of the comparable US products were found to be 25% - 30% higher in cost and their systems had not been approved for use in Canada.

The results of my product search are as follows:

1. Infocaster 2000, U.S.
 - Low Power FM
 - Not remote controllable
 - Not Industry Canada approved
 - price, approx \$6,700.00 cdn
2. Decade Transmitters, Quebec
 - produce High power FM only

3. Information Station Specialists, U.S.
 - AM channel HAR stations only
 - Not Approved for use in Canada
 - price \$30,000 cdn
 - Marketing agent suggested I contact Total North.
4. National Drive By Broadcasting, U.S.
 - Very Low Power FM only
 - Range less than 800m
 - \$3000 cdn
5. Wizard Highway Information Systems
 - Broadcast on CB radio frequencies only
6. Other Interesting Reading on The Subject of HARS
Highway Advisory Radio: Is There Anybody Listening? Jeffrey R. Parenti.
URL: www.ultranet.com/~ruse/report.html

7.0 RECOMMENDATIONS

Based on the results of the test project, public feedback, contractor interest, MCI comments, it is my recommendation that AT&U consider the development of a Highway Advisory Radio System (HARS) program. The program should involve both a permanent installation component as well as a portable unit component. The portable units can be used in emergency situations or on short term construction projects.

Before a program can begin, I believe a couple of things need to happen. Firstly, all of the technical issues/problems related to the function of the radio equipment must be resolved. Secondly, I would recommend that the possibility of partnerships with the RCMP, AMA, Maintenance Contractors and other private sector parties be investigated.

Once partnerships have been established issues such as updating responsibility and licensing can be addressed.

, Since the Total Point 2000VRA system appears to be the system which best meets our requirements, it is recommended that this equipment be purchased on the condition that the outstanding technical issues can be resolved. The outstanding technical issues that need to be addressed include:

- adjustments on the broadcast volume.
- volume on the End of message tone.
- the lack of unit security.
- possible creation of a dial in broadcast feature.

, Upon resolution of the outstanding technical issues, I would recommend that the current Valleyview test location be made into a permanent installation. I would also recommend consideration be given to the installation of 4 additional permanent units in 1999. These units could be located on Hwy 43 at the following locations; East of Grande Prairie, at Whitecourt, Fox Creek and Gunn. These installations will give us full coverage on Hwy 43 between Grande Prairie and the start of divided highway at Gunn.

Based on preliminary discussions with Carl LaPrairie of the LaPrairie Group Maintenance Contractors, he has committed to accepting the responsibility of updating the broadcast messages for the Valleyview radio installation.

Mr. LaPrairie has indicated he would assume this responsibility at no cost to the department.

The **installed** cost of 5 systems is estimated to be \$34,000 (\$6,800/unit) exclusive of signing. Signing would add another \$800 to \$1000 per site. Monthly operating costs may vary slightly based on the units location. During our test project the monthly operating cost was less than \$40/month, essentially the cost of the phone line. Depending on how we decide to proceed on the issue of updating responsibility, the monthly costs may be impacted.

Other locations that could be considered for systems in subsequent years can include but are not limited to:

- Hwy 40 South of Grande Prairie
- Hwy 40 at Grande Cache
- Hwy 40, Hwy 16 at Hinton
- Hwy 63 south of Fort McMurray
- Hwy 55 and Hwy 63
- Various locations on Hwy 35 North of Peace River
- Hwy 11 West of Rocky Mt. House to Nordegg
- Hwy 3 at the Crowsnest Pass
- Possible installations can include selected US border Crossings

Should the department proceed with this program, it is recommended that consideration be given to making the HARS updating responsibility (where applicable) part of the Maintenance Work item in the next round of maintenance contracts.

As part of the portable component of this program, It is recommended that consideration be given to purchasing 2 SAR units (Appendix D). These units would be utilized as part of a portable vehicle based system. It is recommended that this portable system be used as a Highway Advisory Radio System on several of our 1999 chip seal projects. If purchased, the SAR units can also be made available for other construction projects or emergency service type applications.

The total cost of each SAR unit is \$9,800 exclusive of signing. The cost of a portable Windmaster System 3 stand and roll up sign is approx. \$420/unit. Licensing issues related to the portable units are a little more complex however for type of application it will not be an issue.

APPENDIX AA@

**PUBLIC RESPONSE
HIGHWAY ADVISORY RADIO SYSTEM**

Valleyview & District

CHAMBER OF COMMERCE

Box 1020

Valleyview, AB

TOH 3N0

(403)524-4535

Wednesday, January 20, 1999

Alberta Transportation and Utilities
5102 - 50 Avenue
Valleyview, Alberta
TOH 3N0

ATTN: Bruce Hendenon
Contract Maintenance Inspector

Dear Bruce

RE: Highway Test Project – Highway Information FM105.5

The Valleyview & District Chamber of Commerce supports the highway information station that has been in operation in our area for the past month or so. We feel that its location at a major crossroads of highways is a welcomed and essential service not only to the traveling public but also to the local population. Local response is definitely positive, and we certainly want to keep the station here on a permanent basis.

Yours truly,

VALLEYVIEW & DISTRICT CHAMBER OF COMMERCE

Original Signed by:

Ralph Lento
President

“People working together for the community”

NORTHERN GATEWAY REGIONAL DIVISION NO. 10

P.O. BAG 2

VALLEYVIEW, AB TOH 3N0

PHONE: (780) 524-3833

FAX: (780) 524-4256

February 10, 1999

Bruce Henderson
Alberta Transportation & Utilities
Box 1173
Valleyview, AB TOH 3N0

Re: Road Reports on FM Station

Dear Bruce;

It is my understanding that the road reports on the FM radio station are a pilot project. I would like to express my appreciation of this service. I receive weather reports from Environment Canada each morning, and feel that your road reports along with these weather reports give me a good picture of the conditions our local bus drivers will be faced with.

My hope is that this service is expanded to cover all major roads north of Edmonton.

Sincerely,

Original Signed by:

Rhett Czaban
Director, Student Transportation Services

RC/jt

APPENDIX “B”

**APPLICATION FOR CRTC LICENSING EXEMPTION
HIGHWAY ADVISORY RADIO SYSTEM**

To: Secretary General
Canadian Radio-television and Telecommunications Commission
Ottawa, Ontario
K1A 0N2

From: Gordon Duncan
Total Point Inc.

Date: February 8, 99

Re: Licensing Exemption Request For InfoPoint Equipment

Background

Total Point Inc. is a manufacturer of certified low power FM messaging systems designed for public safety services. These systems have been used by qualified public safety officials in various situations to very good results. The Officials have been frustrated in their attempts to deal with the regulatory agencies' whose present regulatory requirements are not relevant. To resolve this issue we respectfully request that the Total Point Inc. system(s) designed for *public safety* applications be exempted from license requirements of the CRTC. Background material as supplied to M. Vogel is supplied herein.

Request

The CRTC exempt the Total Point Inc. products from CRTC licensing requirements under the following conditions:

Each system used by qualified personnel with a specific CRTC-licensable individual assigned responsibility for the equipment.

Power level will not exceed 5 watts.

Systems will be used on a non interfering non protected basis.

The equipment is only used for messaging purposes, i.e. not a broadcast undertaking.

Industry Canada officials will be notified prior to any use.

Some examples of situations anticipated to be covered by the exemption include:

Use by Police/Emergency Personnel/Military/Fire Department/other public officials for informing the public as required.

Environmental Threats/Warnings/Incidents

Industrial Threats/Warnings/Incidents

Evacuations

Public Health information

Search and Rescue operations

Forest Fires

Traffic Safety Advisories

Disasters can not be anticipated. It is therefore necessary to empower the public officials responsible for managing the disaster to use the methods most appropriate to the situation. We respectfully suggest that the direct evidence of the favorable use and utility of the Total Point Inc. equipment is a strong testament to the public interest which will be served by the exemption order requested.

Yours Very Truly,

I

Gord Duncan,
President

cc. Marguerite Vogel
Director
Western Region
530-580 Homby Street
Vancouver, B.C.
V6C 3B6

APPENDIX AC@

**SAMPLE BROADCAST SCRIPTS
HIGHWAY ADVISORY RADIO SYSTEM**

VALLEYVIEW TO THAT ROAD ADVISORY RADIO SCRIPT WRITING TIPS

(DATE AND TIME OF BROADCAST INFORMATION)

CURRENT HIGHWAY 43 ROAD ADVISORY INFORMATION
AS OF ??am JUNE ?, 1999

(LOCATION)

Highway 43 south to Whitecourt etc. etc.

(POINTS OF INFORMATION)

WINTER

WINTER EXAMPLES

VISIBILITY - good/fair/poor, why	fair visibility due to blowing snow
DRIVING LANE CONDITION	poor - poor due to black ice
SHOULDER CONDITION	snow covered
WEATHER ALERTS	freezing rain, heavy snowfall advisory
ROAD CLOSURE INFORMATION	reason for closure, expected reopening
ARE SNOWPLOWS OUT?	Motorists are cautioned that maintenance crews/snowplows are now working to clear the highway. Drivers are cautioned not to pass snowplows as they will periodically pull to let traffic pass.
ACCIDENT ADVISORY	delay information
CONTACT INFORMATION	LaPrairie Group/AT&U phone contact numbers

(GENERAL WINTER WARNING)

Efforts are being made to ensure that road advisory broadcasts are updated as conditions change HOWEVER.....Please remember that visibility and/or highway condition can change very quickly. Motorists should monitor their local media or contact Environment Canada, for the forecasted weather conditions in their region before travelling.

(PUBLIC SERVICE ANNOUNCEMENT)

Thank-you and remember.....

AMBER AND RED MEANS SNOWPLOW AHEAD!!or
DRIVE SAFELY, THAT LIFE YOU SAVE MAY BE YOUR OWN!!or
THINK AND DRIVEor DON'T DRINK AND DRIVEor
BUCKLE UPor
Did you know that ?

AFatal collisions occur most frequently in rural areas, whereas injury and property damage collisions occur more frequently in urban areas@

This information brought to you courtesy of the LaPrairie Group Maintenance Contractors.....

VALLEYVIEW TO THAT ROAD ADVISORY RADIO SAMPLE SCRIPT

This is a test of the Valleyview Road Advisory Radio System. If adopted for use, this system would broadcast road advisory information for highway 43 south to Whitecourt and highway 43 west to Grande Prairie. Broadcast Information could include the current winter road conditions or the location of summer maintenance and/or construction operations.

The road advisory radio system is a test project of the LaPrairie Group Contractors and Alberta Transportation & Utilities. If you have any questions, comments or concerns regarding this broadcast please contact Mr. Bruce Henderson at 524-5123.

CURRENT HIGHWAY 43 ROAD CONDITIONS AS OF 8am JANUARY 18th, 1999

Highway 43 south to Whitecourt is in good winter driving condition. Road surface is bare and dry. Be advised that visibility in the area of TWO CREEKS may be reduced due to fog. This is expected to dissipate by noon today.

Highway 43 west to Debolt is in fair to poor winter condition. The driving lanes are clear with some snow covered and icy sections, shoulders are snow covered. Visibility is reduced due to blowing snow. Be advised that snowplows are currently working on this section of highway, please remember that if you are following a snow plow do not attempt to pass. Plows will pull over periodically to let traffic pass.

Efforts are being made to ensure that road advisory broadcasts are updated as conditions change HOWEVER.....Please remember that visibility and/or highway condition can change very quickly. Motorists should monitor their local media or contact Environment Canada, for the forecasted weather conditions in their region before travelling.

Thank-you and remember

AMBER AND RED MEANS SNOWPLOW AHEAD!!

**VALLEYVIEW TO THAT ROAD ADVISORY RADIO
SAMPLE SCRIPT**

**CURRENT HIGHWAY 43 ROAD ADVISORY INFORMATION
AS OF 8am JUNE 1, 1999**

Motorists travelling Highway 43 south to Fox Creek should expect delays of approximately 2 hour due to highway construction.

ALSO, BE ADVISED THAT THE SPEED LIMIT ON HWY 43 FROM VALLEYVIEW TO TWIN CREEKS HAS BEEN REDUCED TO 80 km/hr. RCMP have issued a warning that the reduced speed limit will be strictly enforced.

Crackfilling operations have now begun on Highway 43 west of Valleyview to Debolt. Motorists should expect minor delays and reduced speed zones in areas where maintenance crews are working.

Due to a serious accident resulting in a chemical spill, RCMP have closed highway 43 north of Valleyview. RCMP anticipate the road to reopen at approximately 12 noon today.

If you have any questions, comments or concerns regarding this broadcast please contact Mr. Bruce Henderson at 524-5123.

Thank-you and.....

Remember to obey all signs and flag people, in areas where construction and/or maintenance crews are operating, the life you save may be your own!

APPENDIX “D”

PORTABLE FM TRANSMITTER INFORMATION

(Can be viewed on the original document)