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Perspectives of the Association of Regional Railways of Canada (ARRC)

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INTRODUCTION

The Association of Regional Railways of Canada (ARRC) is a new organization. It was founded in August of 2001. As ARRC is a new player on the scene, I would like to thank the sponsors of this workshop for the opportunity to participate and I would like to take a few moments to discuss ARRC, its membership and mandate.

The short line and regional railway industry has grown to over 40 railways and has matured in recent years. A number of short lines and regional railways (SL/RRs) have felt that they needed a voice devoted exclusively to their needs and that could articulate their views without the compromises necessary when in association with the Class I railways.

Close collaboration between SL/RRs and their Class I partners is necessary for success, but the interests of SL/RRs are not always identical to those of the Class I railways and an independent voice is needed. ARRC and its members expect to work in a cooperative and collaborative way with the Class I railways and the Railway Association of Canada wherever possible.

The charter members of ARRC are BC Rail, The Hudson Bay Railway, The Carlton Trail Railway, and Ferroequus Railway Company Limited. We are currently in discussion with a number of other railways and expect growth in ARRC's membership.

ARRC's member companies operate approximately 4,067 route-kilometres of track and in 2000 produced over 5 billion revenue ton-miles and had revenues of approximately $450 million.

THE CANADIAN LOCOMOTIVE FLEET AND ITS EMISSIONS

Any discussion of Canadian locomotive emissions needs to take place within the context of Canadian air quality and the relative contribution of emissions by other

segments of society and other transportation modes.
The Kyoto Transportation Table in its foundation document noted that transportation was the single largest contributor of greenhouse gases (GHG). It further noted that with regard to freight transportation, rail produced more ton-miles than truck and marine combined and that trucks produced about 26% of GHG emissions from transportation while rail produced 4%.

These figures alone should indicate that rail is part of the solution, not part of the problem.

The total locomotive fleet in North America is about 35,000 units and of this there are, according to the Locomotive Emissions Monitoring Report published by Environment Canada in October 2000, 3,200 locomotives in Canada. Of this total, ARRC members own 149 units. While some of these units are older units obtained from the Class I companies, our largest member, BC Rail, has re-equipped with GE and GM high-HP units.

In contrast, the Canadian Trucking Alliance reports that there are about 300,000 long-haul Class 8 tractor units in Canada.

THE MEMORANDUM OF UNDERSTANDING (MOU) GOVERNING LOCOMOTIVE EMISSIONS

The current MOU was signed December 27, 1995 and the program was established to cover the period 1990 to 2005. Assuming that rail traffic growth in GTM increased no more than 1.2% annually, the railway industry undertook to cap NO_x emissions at 115 kilotonnes per year.

In the period 1990 to 1998, growth in GTM's averaged 2% per year and while NO_x emissions averaged slightly above the 115 KT target over the *1993-1998* period, in 1998 they were reported at 113.75 KT.

While the railway industry made a formal commitment to cap NO_x emissions at 115 KT annually, the annual report also provides statistics from 1975 to 1998 on CO, HC, SOx, PM, and CO_2, both in absolute terms and on a "per unit of work" basis. CO_2, the main GHG emission, went from 39.857 kg/1000 NTM in 1975 to 26.730 kg/1000 NTM in 1998, a decrease of 33%. All other emissions were reduced on a "per unit of work" basis.

In absolute terms, the emissions remained at about the same levels while traffic grew from 138.6 billion NTM in 1975 to an all-time high of 208.3 billion NTM in 1997 and was at 203.4 billion NTM in 1998.

The means that railway industry output grew by 50.2% in the last quarter century while

holding fuel consumption and emissions constant.
By any standard, the voluntary MOU has been successful in achieving Environment Canada's objectives.

THE RAILWAY SAFETY ACT (RSA)

Recent amendments to the ***Railway Safety Act*** shift responsibility for locomotive emissions control to Transport Canada and this workshop is one step in Transport Canada's deliberations to determine how this control should be exercised.

Environment Canada had the MOU reviewed in 2001 and this will also provide input to the Transport Canada decision.

ARRC MEMBERS' CURRENT EMISSIONS REDUCTION ACTIVITIES

The actions described below relate specifically to ARRC members, but similar actions are being taken by other Canadian short line and regional railways.

The Class I railways are providing comments on their recent actions to manage fuel consumption and thus emissions, and many of the same strategies are in use by ARRC members. A partial list of strategies adopted by ARRC members is as follows:

- reduced locomotive idling time using shut-down devices;
- reduced level of power braking;
- improved train handling and meet planning;
- by BC Rail, renewal of the locomotive fleet with fewer high horsepower units;
- use of slug/master locomotives for yard service;
- testing of top-of-rail (TOR) friction modifiers to reduce wheel/rail friction;
- installing electronic high-efficiency fuel injectors; and,
- use of low sulphur fuels.

These strategies are being undertaken under the current voluntary MOU.

Our largest member, BC Rail, operates a modern, high horsepower fleet, but short line railways often use older lower horsepower units and some of these units have been equipped with "Smart Start" systems to minimize idling time. Not all improvements require investment in new technology. In some instances, our members have established a policy of manually shutting down idling locomotives when the ambient temperature is above 5^{o} Celsius.

RESEARCH AND DEVELOPMENT

Short line and regional railways have limited resources for research and development, but keep abreast of new developments and participate in developmental projects where resources allow.

There are two developmental projects that show promise that I would like to mention.

BC Rail has been working with Kelsan Technology Corp. and the National Research Council on top-of-rail friction modifiers.

The objectives are to reduce friction losses, and thus reduce energy consumption while maintaining enough friction for traction and braking. Friction modifiers can also be used to reduce “wheel squeal” on curves.

BC Rail is currently working with Kelsan and NRC testing the use of friction modifiers in the West Vancouver corridor for noise abatement and also has curve trackage instrumented in another area to measure lateral forces with the use of friction modifiers.

A second project of particular interest to BC Rail and other short lines is the “Green Goat” battery operated hybrid yard switcher under development by Vancouver-based Rail Power.

This prototype switcher is battery operated, producing traction equivalent to a standard 2000 HP diesel-electric locomotive.

The prototype locomotive, currently under test on UP/SP charges the batteries with a 110 HP diesel generator which gives a 90% reduction in emissions compared to a standard diesel-electric yard switcher. This unit can also use a natural gas generator set or fuel cell to recharge the batteries.

This technology would be particularly useful in the three TOMA areas in Canada.

BC Rail will be monitoring the success of the UP/SP tests over the coming year.

ARRC believes that these developments are worthy of government support and ARRC members are prepared to participate in these and other comparable research projects.

THE PROBLEM

In determining the best course of action for Canada, it is necessary to understand the issues as they exist in Canada.

In this context, it should be noted that the Canadian situation is not the same as that in the U.S. and, therefore, importing “made in U.S.A.” policies into Canada is not necessarily the answer for our situation.

The following points need to be considered in developing Canadian strategies, policies and plans.

1. Is our emphasis on reducing ground level ozone or global warming, or both?

2. What impact will Canadian railway actions have on global warming?

3. Canadian air quality is generally better than that of the United States.

4. There are only three Tropospheric Ozone management Areas (TOMAs) in Canada:

   - the lower Fraser Valley in BC;
   - the Windsor-Quebec Corridor; and,
   - Saint John, NB.

A significant portion of the NO_x emissions causing elevated ozone levels in the three TOMAs comes from U.S. sources. Most railway activity is outside these areas and, the only ARRC member with activity in any of the TOMAs is a portion of BC Rail operations in the North Vancouver area.

ARRC RECOMMENDATIONS

Following from the above comments, ARRC recommends that:

1. the voluntary MOU be extended;
2. the emission factors be revised to reflect current fleet make-up and duty-cycle, and fuel specifications;
3. a procedure be put in place to monitor and revise emission factors periodically.

ARRC makes these recommendations for the following reasons:

1. Significant emissions improvements have been made by the railway industry under the current voluntary MOU.

2. The MOU approach is consistent with the philosophy of the ***Railway Safety Act*** that makes management of safety an inherent part of managing a railway.

3. It is a cost-effective approach that is consistent with Canadian needs.

4. Regulations under the **Railway Safety Act** would only apply to federally-regulated railways. Almost all Canadian railways, whether federally or provincially regulated, participate in the existing MOU.

5. The U.S. EPA "Command and Control" approach exempted "incidental" use of Canadian or Mexican locomotives in the United States.

RELATED ISSUES AND CONCLUDING REMARKS

If the national objective is to reduce ground level ozone and reduce emissions that cause global warming, the railway industry should not be treated in isolation.

Any strategy that encourages traffic shifts to rail and ship will have a more significant effect on air quality than mandating and measuring emissions on individual locomotive exhausts.

NO_x and GHG emissions vary directly with the amount of fuel consumed and fuel consumption varies with the work done and the resistances that must be overcome.

The only true measure of fuel efficiency relates to work done, i.e., to ton miles or tonne kilometres, and this holds true for passenger, freight, road, rail, air, and marine.

Rolling resistance of the steel wheel on steel rail is between one-sixth and one-tenth of rubber tires on pavement.

Given other factors such as vehicle tare weights, air, and wind resistance, rail will always to 3 to 5 times more fuel efficient than highway transport.

It is not only true of high-density main lines, but also true of operations where short line and regional railways compete with trucks.

One sensible national strategy would mandate higher locomotive emissions if there were greater offsetting reductions. It is as true of ARRC member companies as it is of the Class I carriers that "railways are part of the solution and not part of the problem."

END