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# **Report of The Technical Working Group on Certain Fuel Quality Parameters**

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## Executive Summary

In response to issues raised in a report by the Pembina Institute<sup>1</sup>, commissioned by the Association of International Automobile Manufacturers of Canada (AIAMC), the Minister of Environment asked the Oil, Gas and Alternative Energy Division of Environment Canada, in collaboration with industry, to make recommendations on a path forward for four fuel quality parameters related to on-road gasoline and diesel. These parameters include sulphur in gasoline, deposit control additives (DCAs) in gasoline, lubricity in diesel, and cetane in diesel. The Minister specified that the recommendation should be in the context of harmonization with the United States<sup>2</sup>, and in the context of environmental and/or health benefits.

In July 2009, a government-industry technical working group was formed to develop the recommended path forward for the four parameters. Industry was also given the opportunity to raise issues related to renewable fuel quality.

The government-industry technical working group has completed its task, and submits the following recommendations on the four parameters:

### **Recommended Path Forward for Sulphur in on-road gasoline**

Canada is currently harmonized with the U.S. on gasoline sulphur levels. In the context of continuing this harmonization, the federal governments of Canada and the U.S. should work jointly to determine benefits and costs of further reduction of gasoline sulphur levels.

### **Recommended Path Forward for Deposit Control Additives (DCAs) in on-road gasoline**

*Note: The Canadian Petroleum Products Institute (CPPI) could not participate in the development of this recommendation on DCAs for competitiveness reasons.*

Environment Canada and Health Canada should assess impacts associated with the identified quality and regulatory gaps, to determine if there are compelling reasons to consider possible government tools to harmonize DCA levels in Canadian gasoline with current U.S. levels. They should also monitor any new efforts in the U.S. on DCAs, and assess impacts associated with harmonizing with future levels.

#### ***Other Possible Actions for DCAs***

There are industry-led options that could be considered, such as a voluntary agreement committing that all on-road gasoline purchased by end-users in Canada will have at least CGSB or EPA equivalent levels of DCAs, but do not restrict marketers from offering higher levels of DCAs.

### **Recommended Path Forward for Cetane Number in on-road diesel**

EC should monitor any new efforts in the U.S., but no additional action is recommended at this time because current cetane numbers are equivalent to, or better than, the U.S. Should the U.S. EPA regulate a cetane number specification, Canada should assess environmental and human health benefits associated with harmonizing with U.S. requirements.

### **Recommended Path Forward for Lubricity in on-road diesel**

EC should monitor any new efforts in the U.S., but no additional action is recommended at this time because current lubricity levels are equivalent to, or better than, the U.S. Also, current lubricity levels are being managed to meet the standard defined by CGSB.

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Some issues related to renewable fuel quality were also raised, and are tabled in Section 5 of this report. These are not consensus recommendations from the working group. Some members recommended that, as a priority, Environment Canada regulate a 10% ethanol blend cap for gasoline and a 5% blend cap for low-level biodiesel blends for conventional vehicles, and that next, Environment Canada regulate appropriate quality parameters for the bio-components and the final blended fuels to minimize operability, volatility, and environmental impacts. Other members indicated that these concerns can be managed more effectively via different processes, such as the joint Industry Auto-Oil Technical forum and the Canadian General Standards Board.

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<sup>1</sup> *Fuel Quality in Canada – Impact on Tailpipe Emissions*, Prepared for the Association of International Automobile Manufacturers of Canada by the Pembina Institute (Jesse Row and Alex Doukas). November 26, 2008

<sup>2</sup> The AIAMC acknowledges that the Minister of Environment tasked the government-industry technical working group to perform data and regulatory gap analyses for four key fuel quality parameters and develop recommendations on a path forward within the context of harmonization with the United States. In this regard, the AIAMC notes that the working group has not undertaken to compare Canadian fuel quality parameters and regulations within the scope of several other leading global jurisdictions, several of which provided the point of departure for the Pembina Institute's report entitled *Fuel Quality in Canada – Impact on Tailpipe Emissions*.

# 1. Background

Governments have been involved in vehicle and fuel standards since the 1950's. In the United States (U.S.) and subsequently in Canada, regulations were initially implemented to improve safety. In the 1970's, starting in California, vehicle emission and complementary fuel standards became the subject of government regulations. Over time, other jurisdictions have become increasingly proactive in vehicle, emission and fuel standards, originally concentrating on reducing criteria air contaminants and more recently focusing on the reduction of greenhouse gas emissions.

Even prior to governments becoming involved, the auto industry and oil industry met in industry-led bodies to set fuel standards, for example ASTM International (originally known as the American Society for Testing and Materials) in the U. S. and the Canadian General Standards Board (CGSB) in Canada. Governments may also participate on the committees that set these standards – Environment Canada representatives involved in the regulation of fuels attend as observers at CGSB.

The ASTM and CGSB standards continue to be used and are subject to active renewal and revision. Standards can developed for a number of reasons, including the promotion of the quality or 'fitness for purpose'<sup>3</sup> of products, such as fuels. These standards cover a large number of aspects of fuel quality that, if adhered to, enable commercially available fuels to function properly in generally available vehicles and engines. These standards are often referred to in commercial transactions and since provincial governments are primarily responsible for commercial matters within their jurisdictions, some provinces reference CGSB standards in fuels regulations.

The Government of Canada has intervened as necessary to regulate or otherwise manage vehicle, engine and fuel standards. There are areas that clearly fall under federal government jurisdiction and there are areas that do not. The Fuels and Vehicle and Engines sections of the Canadian Environmental Protection Act 1999 (CEPA) were written to bring Canada's laws up to date with government policy which has supported general harmonization with the U.S. in vehicle and fuel standards.

CEPA is an Act aimed at "pollution prevention and the protection of the environment and human health in order to contribute to sustainable development"<sup>4</sup>. It has provisions that allow regulation of the quality of fuels. Regulations are in effect under Part 5 of CEPA to control toxic substances in fuels (benzene) and under Part 7, Division 4 of CEPA to control lead, phosphorous and sulphur in gasoline and sulphur in diesel fuel. Regulations are currently being drafted which would require renewable fuel content.

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<sup>3</sup> The CGSB *Procedures Manual for the Development and Review of Standards* states that "The broad aims of standardization that should be addressed... are to promote the following: the quality of products, processes and services by defining those features and characteristics that govern their ability to satisfy given needs, that is, their fitness for purpose;..." (<http://www.tpsgc-pwgsc.gc.ca/cgsb/prgsrv/stdsdev/proc/proc03-e.html>)

<sup>4</sup> Canadian Environmental Protection Act, 1999, c.33

In addition, Part 7, Division 5 of CEPA includes provisions which allow the regulation of vehicles and engines. Environment Canada has considered vehicles and engines and fuels as an integrated system in development of regulatory programs. Various classes of vehicles and engines are subject to the Canadian federal *On-Road Vehicle and Engine Emission Regulations*.

Canada's policy has been to generally harmonize vehicle, engine and fuel standards with the U.S. because of economic and trade reasons and also because the U.S. has traditionally imposed the world's most stringent national standards for vehicle emissions. In the context of harmonization it is important to recognize that there are important differences between the regulatory systems in Canada and the U.S. In Canada, one of the main underpinnings of CEPA authority comes from federal responsibility for criminal law. In the U.S., criminal law rests mainly with the states. The U.S. Environmental Protection Agency (EPA) uses a variety of devices, including certification of vehicles, fuels, and additives in order to enable efficient administration of standards applicable to these very complicated industries.

Environment Canada has, for some time, been involved in review and, if deemed necessary, subsequent regulatory actions regarding vehicle and fuel standards.

In November, 1994 the Canadian Council of Ministers of the Environment (CCME) established a Task Force on Cleaner Vehicles and Fuels to develop options on a national approach to new vehicle emission and efficiency standards and fuel reformulations for Canada. On October 23, 1995 the Council of Ministers endorsed the report of its task force and agreed to work on implementing the recommendations. From that process it was recommended that Environment Canada lead in the development and implementation of regulated national fuel standards to control parameters including benzene, sulphur, summer vapour pressure, aromatics, olefins and deposit control additives in gasoline and sulphur in diesel. Regulations were subsequently passed for sulphur and benzene in gasoline, and sulphur in diesel.<sup>5</sup>

On February 19, 2001, the Minister of the Environment announced the government's 10 year Plan of Action for cleaner vehicles, engines and fuels through a Notice of Intent published in the Canada Gazette.<sup>6</sup> The plan contained several measures aimed at protecting the health and environment of Canadians by improving the quality of fuels.

Specific measures included:

- reducing the level of sulphur by 2006 in on-road diesel fuel, by aligning Canadian requirements with those in the United States;
- establishing a new limit for sulphur in off-road diesel fuel, by aligning Canadian requirements with those being developed in the United States;
- establishing a comprehensive database of diesel fuel quality (cetane, aromatics and PAHs);
- reducing the level of sulphur in light fuel oils used for heating homes and for heavy fuel oils used by industrial facilities;

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<sup>5</sup> *Report to Canadian Council of Ministers of the Environment by the Task Force on Cleaner Vehicle and Fuels*, October 1995.

<sup>6</sup> *Notice of Intent on Cleaner Vehicles, Engines and Fuels - Fuels Agenda*  
Available at: [http://www.ec.gc.ca/Ceparegistry/documents/Notices/g1-13507\\_n1.pdf](http://www.ec.gc.ca/Ceparegistry/documents/Notices/g1-13507_n1.pdf)



- further information gathering for gasoline parameters (such as potential emission effects from toxic substances, deposit control additives, MTBE, driveability index (DI) and DI input parameters such as distillation values and oxygen concentration);
- the exploration of non-regulatory measures to promote the early introduction of cleaner fuels (such as low sulphur fuels).

A supporting document providing details on the various issues considered by Environment Canada in developing the federal cleaner vehicles, engines and fuels agenda, indicated that some stakeholders recommended using the World Wide Fuel Charter as the basis for developing the vehicles and fuels agenda, and others proposed that the compositional requirements of CGSB's commercial standard for gasoline be mandated. The report noted that for a number of reasons, Environment Canada did not consider action to mandate either specification at the time.<sup>7</sup>

The latest notice of intent related to fuel quality was published in December 2006 to develop a federal regulation requiring renewable fuels. The regulation is currently being drafted and a Canada Gazette Part I Notice is planned for the near future.<sup>8</sup>

## 2. Context

In response to issues raised in a report by the Pembina Institute, commissioned by the Association of International Automobile Manufacturers of Canada<sup>9</sup>, the Minister of Environment asked the Oil, Gas and Alternative Energy Division of Environment Canada, in collaboration with industry, to make recommendations on a path forward for four fuel quality parameters. These parameters include sulphur in gasoline, deposit control additives (DCAs) in gasoline, lubricity in diesel, and cetane in diesel. The Minister specified that the recommendation should be in the context of harmonization with the United States, and in the context of environmental and/or health benefits.

Sulphur is a naturally occurring component of petroleum based fuels which can reduce the efficiency of emission control technologies. Deposit Control Additives (DCAs) are added to gasoline to reduce the formation of harmful deposits within certain parts of the engine (e.g. intake valves & fuel injectors) that will increase engine-out emissions and affect vehicle performance. Cetane is a parameter (measured by cetane number) that influences starting diesel engines and combustion noise. Sufficient diesel fuel lubricity aids in reducing the wear of diesel fuel injection equipment such as fuel pumps and injectors. Some information suggests that cetane and lubricity can also impact vehicle exhaust emissions.

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<sup>7</sup> *Support Document to the Notice of Intent on Cleaner Vehicles, Engines and Fuels*, February 2001. Available at: [http://www.ec.gc.ca/CEPARRegistry/8-NOI-SUPP\\_E.pdf](http://www.ec.gc.ca/CEPARRegistry/8-NOI-SUPP_E.pdf)

<sup>8</sup> [http://www.ec.gc.ca/cleanair-airpur/Clean\\_Air\\_and\\_Energy/Renewable\\_Energy/Renewable\\_fuels/Federal\\_Renewable\\_Fuels\\_Regulation\\_-\\_WSC95BCB29-1\\_En.htm](http://www.ec.gc.ca/cleanair-airpur/Clean_Air_and_Energy/Renewable_Energy/Renewable_fuels/Federal_Renewable_Fuels_Regulation_-_WSC95BCB29-1_En.htm)

<sup>9</sup> *Fuel Quality in Canada – Impact on Tailpipe Emissions*, Prepared for the Association of International Automobile Manufacturers of Canada by the Pembina Institute (Jesse Row and Alex Doukas). November 26, 2008

### 3. Process

In June, 2009, Environment Canada held a meeting with industry stakeholders from the oil and automobile industries, to discuss how best to deliver a recommendation to the Minister of the Environment on the four fuel quality parameters. There was consensus that a technical working group should be established to develop these recommendations.

It was also determined that this technical working group would be the forum for industry to raise issues related to renewable fuel quality. As mentioned in the Background section, in December 2006 the government published a notice of intent to develop a federal regulation requiring renewable fuels. The government decided that the quality of renewable fuels would not be addressed in this regulation. However, some industry stakeholders at the June 2009 meeting reiterated previously raised concerns related to renewable fuel quality, and Environment Canada agreed that although the focus of the technical working group was to develop recommendations on the four parameters, it could also be the forum to raise issues on renewable fuel quality.

The Technical Working Group (TWG) was established in July, and included representatives from the oil, automotive, trucking, and engine manufacturing industries, as well as a number of federal government departments. The list of TWG members can be found in Annex 1.

A Terms of Reference was developed, which can be found in Annex 2. They agreed upon a mandate to: "...develop recommendations for Environment Canada with respect to the path forward for certain fuel quality parameters in Canada, in the context of benefit to the environment or to health as well as harmonization with U.S. federal regulations for fuel quality. These fuel quality parameters include but may not be limited to sulphur and deposit control additives in gasoline, and cetane and lubricity in diesel. Once recommendations have been agreed upon for these four parameters, the Technical Working Group may develop recommendations with respect to other considerations related to fuel quality".

The group developed a workplan, found in Annex 3, which includes the following key steps:

1. Gather available data to understand the current state of Canadian gasoline or diesel quality with respect to each parameter.
2. Understand the current state of U.S. federal regulations for each parameter (if applicable).
3. Compare the current Canadian fuel quality (with respect to each parameter) with the level federally regulated by the U.S. (if applicable), to determine if there is a quality gap.
4. Where a quality gap exists, determine the potential reduction to air emissions that could be achieved by filling the gap in Canadian fuel quality to meet the levels regulated in the U.S. This would require scientific evidence that demonstrates a quantitative link between each parameter and vehicle emissions.
5. Discussion of any other considerations (e.g. renewable fuel quality).
6. Prepare a recommended path forward for consideration by the Minister of the Environment.

The group held 5 meetings between August and October, in order to complete these steps and develop recommendations for Environment Canada. The agendas and notes from these meetings can be found in Annex 4.

The results of the working group's discussions and agreements have been compiled into this report, which will be provided to the Minister of the Environment for consideration.

*The AIAMC acknowledges that the Minister of Environment tasked the government-industry technical working group to perform data and regulatory gap analyses for four key fuel quality parameters and develop recommendations on a path forward within the context of harmonization with the United States. In this regard, the AIAMC notes that the working group has not undertaken to compare Canadian fuel quality parameters and regulations within the scope of several other leading global jurisdictions, several of which provided the point of departure for the Pembina Institute's report entitled Fuel Quality in Canada – Impact on Tailpipe Emissions.*

## 4. Results & Recommendations on the Four Parameters

For each parameter, the working group gathered and analyzed information in accordance with the workplan steps, in order to develop a recommended path forward. This information is presented in the following section for each of the four parameters.

### 4.1 Sulphur in on-road gasoline

#### 4.1.1 Regulatory Situation in Canada and the U.S. for Sulphur

*Federal Regulations:* Both the U.S. Environmental Protection Agency (U.S. EPA) and Environment Canada limit sulphur in gasoline to a 40 ppm maximum, or a yearly pool average of 30 ppm with maximum content permitted to 80 ppm. There is some variation between Canada and the U.S. in the allowable timeframe to achieve these regulations. Canada made the transition to 30 ppm average / 80 ppm maximum sulphur levels in one step whereas the U.S. EPA is transitioning to the same sulphur levels using a phased-in approach.

The U.S. EPA Final Rule, including its provision for waivers as well as its subsequent regulatory amendments, provided U.S. industry a four to six year period of relief during which less stringent gasoline sulphur requirements applied to small refiners and to specific geographic areas where immediate implementation of the new sulphur levels might cause undue hardship or gasoline shortages. This phase-in period will end in 2010. At that time there should be no difference in sulphur levels or federal regulations between Canada and the U.S.

#### 4.1.2 Actual Fuel Quality Gap Analysis for Sulphur

Data sources for sulphur in gasoline include data from Environment Canada's regulatory program, and data purchased from the Alliance of Automobile Manufacturers (AAM) and from Alberta Research Council (ARC). This data is presented in Table 1. The most comprehensive data set (EC) has average sulphur levels in Canada at approximately 18ppm for 2008.

**Table 1\*: Reported and Purchased Data on Sulphur in Gasoline**

		Sulphur mg/kg (ppm wt.)			
		AVERAGE		MAXIMUM	
		ASTM D5453	ASTM D2622	ASTM D5453	ASTM D2622
<b>Auto Alliance Data</b> (Summer '08 / Winter '08), 15 CAN sample points, 79 U.S. sample points)	U.S.	14 / 15	<35 / <35	24 / 26	218 / 218
	CAN	12 / 15	19 / 17	17 / 22	32 / 34
<b>Sulphur in Gasoline Regulations Data</b> (2008, 20 YPA/Cap and 6 flat limit reports) YPA limits = 30 ppm average, 80 ppm cap. Flat limit = 40 ppm max.	CAN YPA & Cap	18		79 (AVG 46)	
	CAN Flat limit	28		34	
<b>ARC Data</b> (Winter 2009)	CAN	14		29	

*\*Note on Table 1: For the purposes of this Technical Working Group, data from both ASTM test methods D5453 and D2622 was gathered. However under the Sulphur in Gasoline regulations, data is only reported using ASTM D5453 or Minister-approved equivalents.*

There is no quality gap for actual concentrations of sulphur in gasoline between Canada and the United States and the data shows that industry is able to limit concentrations well within the regulated limits. Where data was available for samples from both Canada and the U.S. (Auto Alliance data), both the average and maximum sulphur levels are lower in Canada.

#### **4.1.3 Data Gaps for Sulphur**

There are no significant gaps in available data for this parameter.

#### **4.1.4 Environmental / Health Benefits for Sulphur**

The workplan used to guide the development of a recommended path forward for sulphur in gasoline included the following steps:

- 1) Gather available data to understand the current state of sulphur quality in Canadian gasoline.
- 2) Understand the current state of U.S. federal regulations for sulphur in gasoline (if applicable).
- 3) Compare the current levels of sulphur in Canadian gasoline with the level federally regulated by the U.S. (if applicable), to determine if there is a quality gap.
- 4) Where a quality gap exists, determine the potential reduction to air emissions that could be achieved by filling the gap in Canadian fuel quality to meet the levels regulated in the U.S. This would require scientific evidence that demonstrates a quantitative link between sulphur and vehicle emissions.
- 5) Discussion of any other considerations.
- 6) Prepare a recommended path forward for consideration by the Minister of the Environment.

However, in Step 3, the working group determined that sulphur quality in Canadian gasoline is equal to or better than that of the U.S. federal regulation (i.e. no quality gap). With no quality gap to fill, there were no potential air emission reductions to be determined in Step 4. Therefore, although information regarding the link between sulphur and vehicle emissions was tabled, it was not explored fully. It was not necessary to quantify potential environmental or health benefits in order to make a recommendation on the path forward.

#### **4.1.5 U.S. Considerations for Sulphur**

The U.S. EPA has indicated to Environment Canada in the fall of 2009 that “The EPA is currently conducting tests to determine the magnitude of reductions in emissions that would result from sulphur levels in the 10ppm range. The results of this work, coupled with cost information and assessment of the enablement of new vehicle technologies, might potentially feed into a regulatory process to further reduce sulphur in gasoline”.

#### 4.1.6 Other Considerations for Sulphur

Factors to consider include enabling the introduction of new vehicle emission technologies, refinery costs, security and trade impacts, and other potential costs and benefits.

Lean burn gasoline engine technologies are now being introduced into North America, starting in California, which will improve vehicle fuel economy. For these technologies to meet emission standards it has been necessary to redesign catalysts to further reduce concentrations of NO<sub>x</sub> in the exhaust. These catalysts operate less efficiently as levels of sulphur in gasoline are increased. Regarding lean burn engines The Pembina Institute report includes a statement: “The performance of these devices, however, is significantly limited by SO<sub>x</sub> emissions which occupy and poison catalyst locations intended to break down NO<sub>x</sub> emissions. Without reducing sulphur content to 10ppm or below, the AECC (Association for Emissions Control by Catalyst) contends that such technologies can not be used given current emission standards, despite the improvement in fuel economy they might provide.”

The Alliance of Automobile Manufacturers released a report in June 2009, entitled *UUNational Clean Gasoline: An Investigation of Costs and Benefits* that focuses on “examining the costs and benefits of introducing a cleaner national gasoline, defined as a Clean Air Act regulatory standard, into the U.S. market.” The report recommends both the U.S. EPA and California regulating sulphur to 10 ppm maximum, to “Reduce emissions from the existing fleet and enables fuel efficient lean burn technologies”

The American Petroleum Institute (API) advised the U.S. EPA that they should investigate the level of gasoline direct injection (GDI) anticipated / incurred as a driver for the Europe / Far East move to 10 ppm sulphur; as well that the U.S. EPA should monitor cost-effective means for reducing tailpipe vehicle emissions (noting that GDI is an expensive technology). API has indicated to the U.S. EPA that a 10 ppm sulphur average standard is preferable to a 10 ppm cap, and may involve less in terms of refinery modifications and potential lead times.

While it is recognized that further reduction of gasoline sulphur level may enable the introduction of certain new vehicle emission technologies, any decision needs to also take into consideration the impact such sulphur reduction may have on the overall refining industry emissions (CAC and GHG) and costs.<sup>10</sup>

When Canada’s *Sulphur in Gasoline Regulations* were published in 1999, a regulatory impact analysis was included. Benefits considered in this analysis consisted of health and environmental benefits, economic and social benefits, and vehicle/fuel compatibility benefits. Costs considered

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<sup>10</sup> The following studies illustrate these impacts:

- CONCAWE Report no. 00/54 *Impact of a 10 ppm Sulphur Specification for Transport Fuels on the EU Refining Industry*, 2000 (updated in 2005).
- CONCAWE Report no. 8/08 *Impact of Product Quality and Demand Evolution on EU refineries at the 2020 Horizon - CO<sub>2</sub> Emissions Trend and Mitigation Options*, 2008
- CPPI, Natural Resources Canada, Environment Canada and Industry Canada Report *Economic and Environmental Impacts of Removing Sulphur from Canadian Gasoline and Distillate Production*, 2004.

in the analysis consisted of impacts on the refining industry, impacts on independent suppliers, and costs to individuals and consumers. Key results included: reduced air emissions leading to health improvement of Canadians; the enablement of more optimal performance of emission control technologies in low-emission vehicles while removing barriers to the introduction of such technologies; lower refinery margins and company profits; possible increased competition/pricing of gasoline imports; potential labour force reductions due to refinery closures; and higher fuel prices for consumers.<sup>11</sup>

#### **4.1.7 Conclusions (Summary of Findings Regarding Sulphur)**

- Both Canada and the U.S. have a federal regulation for sulphur. Although the limits are the same, there is some timing variation because the U.S. is using a phased-in approach. This will end in 2010, at which time there will be no gap in sulphur federal regulations between Canada and the U.S.
- Based on data reported to and purchased by Environment Canada, Canadian gasoline sulphur levels are of equal or better quality than the U.S.
- There are both costs and benefits to decreasing sulphur levels in gasoline:
  - ⇒ There is a link between sulphur and vehicle emissions (related to catalysts). The Regulatory Impact Analysis Statement for the Department of the Environment Sulphur in Gasoline Regulations (published in 1999), indicated that “A lower level of sulphur in gasoline will directly decrease vehicle emissions of sulphur-related air pollutants and will reduce other gaseous vehicle pollutants by enabling vehicle pollution control systems to function more efficiently”. The average sulphur content of Canadian gasoline at the time of this publication was 350 ppm.
  - ⇒ There is a link between lower sulphur levels and the potential introduction of new vehicle technologies (such as lean-burn engines).
  - ⇒ There is a link between reduction of sulphur levels in gasoline and increased GHG emissions at refineries.
- The U.S. EPA has indicated to Environment Canada in the fall of 2009 that “The EPA is currently conducting tests to determine the magnitude of reductions in emissions that would result from sulphur levels in the 10ppm range. The results of this work, coupled with cost information and assessment of the enablement of new vehicle technologies, might potentially feed into a regulatory process to further reduce sulphur in gasoline”.

#### **4.1.8 Recommended Path Forward for Sulphur**

Canada is currently harmonized with the U.S. on gasoline sulphur levels. In the context of continuing this harmonization, the federal governments of Canada and the U.S. should work jointly to determine benefits and costs of further reduction of gasoline sulphur levels.

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<sup>11</sup> Canada Gazette Part II (Vol 133, No.13, 23/6/99). Available at: [http://www.ec.gc.ca/ceparegistry/documents/regs/g2-13313\\_rias1.pdf](http://www.ec.gc.ca/ceparegistry/documents/regs/g2-13313_rias1.pdf)

## **4.2 Deposit control additives in on-road gasoline**

### **4.2.1 Regulatory Situation in Canada and the U.S. for DCAs**

*Federal Regulations:* The U.S. EPA has in place regulations that require that gasoline may not be sold or transferred to a party who sells or transfers gasoline to the ultimate consumer unless such gasoline contains detergent additives which have been certified according to regulated requirements. This regulation is a requirement of the U.S. Clean Air Act. Canada has no such requirement.

*Provincial / Territorial Requirements:* British Columbia, Manitoba and Quebec require adherence to Canadian General Standards Board (CGSB) standards which include a requirement for deposit control additives equivalent to EPA requirements (as per CAN/CGSB-3.5-2004: Unleaded Automotive Gasoline and CAN/CGSB-3.511-2005: Oxygenated Unleaded Automotive Gasoline Containing Ethanol (Amendment)). Ontario also requires a portion<sup>12</sup> of its gasoline to meet CGSB-3.511-2005.

Within the CGSB Standard, there are several alternatives for complying with the standard. In any case, the marketer/producer must maintain records of volumes of gasoline and additives, to show that the gasoline does contain the amount of additive stated. See Annex 5 for descriptions of CGSB-3.5 and 3.511 standards with respect to DCAs and the U.S. EPA requirements for DCAs.

### **4.2.2 Actual Fuel Quality Gap Analysis for DCAs**

Data sources for DCAs in gasoline include data purchased from the Alliance of Automobile Manufacturers (AAM) and from Alberta Research Council (ARC), as well as data reported to Environment Canada (EC)'s regulatory program, and data from CPPI-member refineries and other refineries in Canada, as well as data from CIPMA and AQUIP.

#### Sample Data Purchased

Purchased data is presented in Table 2 below.

The Alliance of Automobile Manufacturers (AAM) data on DCAs comes from measuring 20 Canadian and 251 U.S. sample points in the summer of 2008, and 20 Canadian and 232 U.S. sample points in the winter of 2008. Samples were obtained from branded outlets. Alberta Research Council (ARC) data on DCAs comes from measuring 53 samples taken in the winter of 2009, using ASTM D381. Samples have been obtained from branded outlets in Canada.

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<sup>12</sup> The Ontario Ethanol in Gasoline Regulations require ethanol-blended gasoline for use or sale in Ontario to meet *CGSB 3.511: Oxygenated Unleaded Automotive Gasoline Containing Ethanol (Amendment)* or *ASTM D5798-09B: Standard Specification for Fuel Ethanol (Ed75-Ed85) for Automotive Spark-Ignition Engines*. Since the latter standard (covering E75 to E85 blends) does not currently require the use of DCAs and the entire regulation only covers ethanol-blended gasoline, it cannot be said that all gasoline sold in Ontario is mandated to meet the CGSB 3.511 standard. These regulations can be accessed at: <http://www.ene.gov.on.ca/envision/ethanol/>



Unwashed gum levels for similar DCAs generally provide a qualitative indication of the level of DCAs<sup>13</sup>, but may not correlate well across different DCA types and formulations, and should not be used on their own to confirm presence of DCAs or measure DCA concentration.

**Table 2: Purchased Data on DCAs in Gasoline**

		Unwashed Gums (mg/100ml)	
		MIN	AVG
<b>Auto Alliance Data</b> (Summer '08 / Winter '08), 15 CAN sample points, 79 U.S. sample points)	U.S.	2.6 / 1.6	11.5 / 10.5
	CAN	4.0 / 5.0	11.1 / 11.1
<b>ARC Data</b> (Winter '09)	CAN	4.5	15.0

From the unwashed gum data, it appears that branded Canadian gasoline may, on average, be of better quality than U.S. fuel for this parameter, notwithstanding the absence of regulations.

### Additional Data Collected

The following summarizes the information collected to establish current Canadian gasoline quality with respect to DCAs. A more detailed explanation can be found in Annex 5.

*Canadian Refinery Production & Import:* All Canadian refiners reported information for gasoline they produced or imported for sale in Canada, corresponding to the following categories:

1. at least CGSB or higher levels of DCAs,
2. less than CGSB levels of DCAs and
3. unknown levels of DCAs (i.e. refineries sell gasoline without DCAs as per supplier / purchaser agreements, and do not know if DCAs are added prior to retail sale)

*Gasoline Purchased Domestically by Non-Refiner Marketers:* Information was obtained from a number of sources:

- ⇒ Canadian Independent Petroleum Marketers Association (CIPMA): Association members account for ~21.6% of gasoline sold at retail sites in Canada. This breaks down into: ~19% at least CGSB levels of DCAs, ~1.6% unadditized and ~0.9% unknown DCA levels. *Note: a portion of the volume reported by CIPMA is either sold at refiner-branded retail sites managed by CIPMA members, or is sold by refiners to CIPMA members already additized.*
- ⇒ Association Québécoise des Indépendants du Pétrole (AQUIP): All gasoline imported or domestically purchased by their members contains DCAs that meet CGSB standards (as CGSB is regulated in Quebec), even if some of that volume is sold in another province.
- ⇒ Based on MJ Erwin's *National Retail Petroleum Site Census – 2008*, it was possible to estimate the amount of the remaining gasoline (for which the DCA content is unknown) that is sold in provinces that mandate CGSB.

<sup>13</sup> Assuming that a sample of gasoline is on-specification (i.e. not contaminated with heavy components)

*Gasoline Imported by Non-Refiner Marketers:* Based on information submitted to EC for regulatory purposes and EC’s follow-up with non-refiner marketers, EC was able to conclude that 100% of gasoline imported into Canada by non-refiner marketers in 2008<sup>14</sup> was subsequently additized to contain at least CGSB levels of DCAs at the point of retail sale.

The above data is combined in Table 3 to summarize DCA levels in Canadian gasoline.

**Table 3: Summary of DCA levels in Canadian Gasoline (2008)**

	<b>DCA Levels</b>	<b>% by Volume</b>
<b>DCA Levels in Canadian Gasoline in 2008</b>	At least CGSB or higher levels	95.9%
	Not Additized	1.6 %
	Unknown levels	1.0 % <i>(sold in provinces that mandate CGSB for DCAs)</i>
		1.5% <i>(sold elsewhere)</i>
	<b>Total</b>	<b>100%</b>

Therefore, a quality gap exists. Between 3.1% and 4.1% of Canadian gasoline may not contain DCAs at the level federally regulated in the U.S. (1.0% is unknown but sold in provinces that mandate the CGSB standard for DCAs, 1.5% is unknown and 1.6% is unadditized). This is approximately between 1.26 and 1.67 billion litres (*see Annex 5 for a more detailed discussion*).

### 4.2.3 Data Gaps for DCAs

For approximately 2.5% of Canadian gasoline, the level of DCAs is unknown.

### 4.2.4 Environmental / Health Benefits for DCAs

The workplan used to guide the development of a recommended path forward on DCAs included the following steps:

- 1) Gather available data to understand the current state of DCA quality in Canadian gasoline.
- 2) Understand the current state of U.S. federal regulations for DCAs in gasoline (if applicable).
- 3) Compare the current levels of DCAs in Canadian gasoline with the level federally regulated by the U.S. (if applicable), to determine if there is a quality gap.

<sup>14</sup> Based on demand and supply, importers vary from year to year – as such this data is representative of 2008 only. However, in general, independent associations have indicated the following:

- Canadian Independent Petroleum Marketers Association (CIPMA): Generally, more than 90% of gasoline imported by CIPMA members is imported into provinces where the CGSB standard is regulated.
- Association Québécoise des Indépendants du Pétrole (AQUIP): 100% of gasoline imported by AQUIP members is imported into a province where the CGSB standard is regulated.
- Note there is some membership overlap between CIPMA and AQUIP.

As such, for any given year, this value is between 90% and 100%.

- 4) Where a quality gap exists, determine the potential reduction to air emissions that could be achieved by filling the gap in Canadian fuel quality to meet the levels regulated in the U.S. This would require scientific evidence that demonstrates a quantitative link between DCAs and vehicle emissions.
- 5) Discussion of any other considerations.
- 6) Prepare a recommended path forward for consideration by the Minister of the Environment.

In Step 3, the working group determined that there is a quality gap with regards to the level of DCAs in Canadian gasoline as compared to the U.S. federal regulation. As such, the recommended path forward includes a component that suggests Environment Canada and Health Canada assess impacts associated with adding DCAs to the remaining amount of gasoline.

#### **4.2.5 U.S. Considerations for DCAs**

The U.S. EPA has indicated to Environment Canada in the fall of 2009 that “Under the EPA program, a requirement of the Clean Air Act, compliance rests on provision of certification information, record keeping and reporting. The dynamic nature of fuel formulation, including the impacts of renewable fuels and the evolution of vehicle technologies make it difficult to maintain a program that ensures effective in-use deposit control.”

The U.S. EPA estimated the magnitude of reductions in emissions that would result from their regulation of DCAs, in their Regulatory Impact Analysis (RIA) and Regulatory Flexibility Analysis (RFA) for the Interim Detergent Registration Program and Expected Detergent Certification Program, 1995. However, there are important considerations to note if using this information to estimate potential emission reductions in Canada:

- The improvements to emissions were based on estimates of then existing conditions in the U.S. where 60 percent of gasoline was sufficiently additized, 30 percent contained some minimum level of intake valve deposit (IVD) control and 10 percent contained no IVD control. In order to estimate the impacts in Canada it would be necessary to account for current Canadian use of DCAs which, as described above, is significantly improved over that which was estimated to exist in the U.S. in the early 1990’s.
- The emission research used to inform this work was based on vehicle technologies from 1983 to 1990.
- An estimate of potential emission reductions in Canada should consider the percentage of emission reductions as opposed to a comparison of absolute numbers because of the differences in size and condition of the gasoline pool and the vehicle fleet and current vehicle technologies, as well as the differences in regulatory environment and industry structure between the two countries.

#### **4.2.6 Other Considerations for DCAs**

Some major automobile manufacturers have initiated a program called TOP TIER™ to encourage gasoline manufacturers to meet a more progressive standard for detergent additives. As part of the TOP TIER™ background material, the following statement is made: “EPA minimum detergent requirements do not go far enough to ensure optimal engine performance. Since the minimum additive performance standards were first established in 1995, most gasoline marketers have actually reduced the concentration level of detergent additive in their gasoline by

up to 50%.” Note that approximately 40% of gasoline sold in Canada and 30 – 35% of gasoline sold in the U.S. contains TOP TIER™ approved levels of gasoline.

Differentiation of fuel quality, on the basis of deposit control additives, is being advertised by at least one major oil company to enhance sales. Competitive drivers may impact this fuel quality parameter.

Efforts should also be undertaken to develop appropriate commercial standards for DCAs, including standards for new vehicle technologies.

#### **4.2.7 Conclusions (Summary of Findings Regarding DCAs)**

- There is a federal regulatory gap between Canada and U.S. with regards DCAs  
⇒ U.S. has a regulation that requires the use of DCAs, Canada does not
- Based on presented data for unwashed gums, it appears that branded Canadian gasoline may, on average, contain higher levels of DCAs than U.S. gasoline.
- There is a small percentage of gasoline sold in Canada that does not contain any level of DCAs (and therefore would not meet the U.S. federally regulated levels, and does not meet the CGSB standards for DCAs in gasoline)
- There is also a small percentage of gasoline sold in Canada for which the amount of DCAs is unknown
- The U.S. EPA has indicated to Environment Canada in the fall of 2009 that “Compliance to the U.S. EPA’s regulation for DCAs depends on provision of certification information, record keeping and reporting. The dynamic nature of fuel formulation, including the impacts of renewable fuels and the evolution of vehicle technologies make it difficult to maintain a program that ensures effective in-use deposit control.”
- Although there is a regulatory gap between Canada and the U.S., over 96% of Canadian gasoline contains DCAs at levels that meet the U.S. regulatory requirement (CGSB levels), and over 40% of Canadian gasoline contains DCAs at higher levels. This has been achieved through a combination of regulations in some provinces, as well as specific initiatives led by select auto and oil companies.

#### **4.2.8 Recommended Path Forward for DCAs**

*Note: The Canadian Petroleum Products Institute (CPPI) could not participate in the development of this recommendation on DCAs for competitiveness reasons*

Environment Canada and Health Canada should assess impacts associated with the identified quality and regulatory gaps, to determine if there are compelling reasons to consider possible government tools to harmonize DCA levels in Canadian gasoline with current U.S. levels. They should also monitor any new efforts in the U.S. on DCAs, and assess impacts associated with harmonizing with future levels.

**Other Possible Actions for DCAs:** There are industry-led options that could be considered, such as a voluntary agreement committing that all on-road gasoline purchased by end-users in Canada will have at least CGSB or EPA equivalent levels of DCAs, but do not restrict marketers from offering higher levels of DCAs.

## 4.3 Cetane in on-road diesel

### 4.3.1 Regulatory Situation in Canada and the U.S. for Cetane

*Federal Regulations:* The EPA program, a requirement of the Clean Air Act, regulates a maximum 35 percent aromatics or a minimum 40 cetane index. Canada does not have a similar regulation.

*Provincial / Territorial Requirements:* CAN/CGSB-3.517-2007 (Automotive (on-road) Diesel Fuel) and CAN/CGSB-3.520-2005 (Automotive Low-Sulphur Diesel Fuel Containing Low Levels of Biodiesel Esters (B1-B%)) include requirements for a minimum 40 cetane number and are regulated by the provinces of Quebec, Manitoba and PEI.

### 4.3.2 Actual Fuel Quality Gap Analysis for Cetane

Data on diesel cetane was provided by Canadian refiners, and purchased from the Alliance of Automobile Manufacturers (AAM) and Alberta Research Council (ARC).

The Canadian oil industry indicates that all of their on-road diesel meets CGSB standards for cetane number which represents approximately 99% of the on-road diesel volume in Canada.

Purchased data is summarized in Table 4. AAM provided analysis applicable to 17 data points in Canada and 150 in the United States for each of summer and winter 2008. Both cetane number and cetane index were measured. Average numbers for both countries for cetane number were similar (for Canada 47.8/46.5 and for the U.S. 45.6/46.0) with the range of values for United States samples being greater than for Canada (as expected for a greater sample size). ARC data on diesel cetane number included analysis of 21 samples taken from branded stations in Canada. Values ranged from 42.3 to 48.6 with a 44.7 average.

**Table 4: Purchased Data on Diesel Cetane Number**

		Cetane Number	
		AVG	MIN
<b>Auto Alliance Data</b> (Summer '08 / Winter '08) (17 CAN sample points, 150 U.S. sample points)	U.S.	45.6 / 46.0	39.7 / 40.1
	CAN	47.8 / 46.5	43.5 / 41.8
<b>ARC Data</b> (Winter '09)	CAN	44.7	42.3

From the presented data, it appears that on average, all branded diesel meets or exceeds the CGSB standard of a minimum cetane number of 40.

### **4.3.3 Data Gaps on Cetane**

It was identified during Meeting 2 that the cetane properties of diesel imported into Canada by non-refiner marketers are a data gap. Based on data from Environment Canada's Fuels Information Regulations, No. 1, the number of non-refiner importers of diesel varies from year to year, but the volume consistently represents around 1% of the diesel sold in Canada. In addition, a large portion of this 1% is imported into provinces that regulate the CGSB cetane standard. Therefore, the data gap represents less than 1% of diesel sold in Canada. At the Fuel Quality Technical Working Group Meeting #3 on September 17<sup>th</sup> 2009, members agreed that no additional data needed to be collected in order to confirm the current state of Canadian fuel quality with respect to this parameter.

### **4.3.4 Environmental / Health Benefits of Cetane**

The workplan used to guide the development of a recommended path forward on cetane included the following steps:

- 1) Gather available data to understand the current state of cetane quality in Canadian diesel.
- 2) Understand the current state of U.S. federal regulations for cetane in diesel (if applicable).
- 3) Compare the current levels of cetane in Canadian diesel with the level federally regulated by the U.S. (if applicable), to determine if there is a quality gap.
- 4) Where a quality gap exists, determine the potential reduction to air emissions that could be achieved by filling the gap in Canadian fuel quality to meet the levels regulated in the U.S. This would require scientific evidence that demonstrates a quantitative link between cetane and vehicle emissions.
- 5) Discussion of any other considerations.
- 6) Prepare a recommended path forward for consideration by the Minister of the Environment.

However, in Step 3, the working group determined that cetane quality in Canadian diesel is equal to or better than that of the U.S. federal regulation (i.e. no quality gap). With no quality gap to fill, there were no potential air emission reductions to be determined in Step 4. Therefore, although information regarding the link between cetane and vehicle emissions was tabled, it was not explored fully. It was not necessary to quantify potential environmental or health benefits in order to make a recommendation on the path forward. (As there is no quality gap, there would be no benefits).

### **4.3.5 U.S. Considerations for Cetane**

The EPA indicated to Environment Canada in the fall of 2009 that "The current EPA regulation for diesel cetane does not have large impacts on criteria pollutant emissions. Enforcement is not a significant issue because pipeline quality standards and exchanges cause industry participants to protect themselves from potential variances".

#### **4.3.6 Other Considerations for Cetane**

According to NRCAN OEE Energy Use Data Handbook, in 2006, diesel represented 20% of energy use in the transportation sector. Information from Environment Canada indicates 84% of this was used in heavy-duty trucks, whereas 10% and 6% was used in medium-duty vehicles and light-duty vehicles respectively.

For the above statistics, light-duty vehicles include all cars and light trucks with a gross vehicle weight  $\leq 3855$  kg and medium-duty vehicles have a gross vehicle weight between 3856 and 4536 kg.

A report published by the U.S. EPA in February 2003 entitled "The Effect of Cetane Number Increase Due to Additives on NO<sub>x</sub> Emissions from Heavy-Duty Highway Engines states "Engines equipped with exhaust gas recirculation (EGR), however, are expected to become an increasingly important part of the highway fleet beginning this year. EGR-equipped engines are expected to exhibit no discernable NO<sub>x</sub> response to cetane ..." (page 28), indicating that diesel cetane number has different impacts on emissions depending on engine technology with newer engines being less impacted than older ones.

#### **4.3.7 Conclusions (Summary of Findings Regarding Cetane)**

- There is a regulatory gap between Canada and U.S. with regards to federal regulations pertaining to cetane
  - ⇒ U.S. EPA regulates to a cetane index of at least 40, Canada does not
  - ⇒ The purpose of this U.S. rule was to regulate aromatic content
- The purchased data shows that all branded diesel meets or exceeds the CGSB standard of a minimum cetane number of 40. Refiners in Canada have indicated that all of their on-road diesel meets or exceeds the same CGSB standard.
- The only data gap identified was the non-refiner importers which represents less than 1% of diesel sold in Canada. At Meeting #3, the working group agreed that no additional data is needed to confirm the current state of Canadian fuel quality with respect to cetane.
- Based on presented data, the cetane number quality of Canadian diesel is at least as good as or better than that of the U.S.
- The U.S. EPA has indicated to Environment Canada in the fall of 2009 that "The current EPA regulation for diesel cetane does not have large impacts on criteria pollutant emissions. Enforcement is not a significant issue because pipeline quality standards and exchanges cause industry participants to protect themselves from potential variances."

#### **4.3.8 Recommended Path Forward for Cetane Number**

EC should monitor any new efforts in the U.S., but no additional action is recommended at this time because current cetane numbers are equivalent to, or better than, the U.S. Should the U.S. EPA regulate a cetane number specification, Canada should assess environmental and human health benefits associated with harmonizing with U.S. requirements.

## 4.4 Lubricity in on-road diesel

### 4.4.1 Regulatory Situation in Canada and the U.S. for Lubricity

*Federal Regulations:* The U.S. EPA does not regulate diesel lubricity, nor does Canada.

*Provincial / Territorial Requirements:* Manitoba, Quebec and PEI regulate the CGSB standard for lubricity. Both existing CGSB Standards for On-Road Diesel (CAN/CGSB-3.517 Automotive (On-road) Diesel Fuel & CAN/CGSB-3.520 Automotive Low-Sulphur Diesel Fuel Containing Low Levels of Biodiesel Esters (B1-B5)) include a lubricity requirement.

Note that while both CGSB and ASTM standards for diesel include conditions for lubricity, the lubricity requirement specified in the CGSB standard can be met using the High Frequency Reciprocating Rig (HFRR) test with a maximum wear scar diameter of 460 µm at 60°C while the lubricity requirement in the ASTM standard can be met with a maximum wear scar of 520 µm at 60°C.

### 4.4.2 Actual Fuel Quality Gap Analysis for Lubricity

Data on diesel lubricity was provided by Canadian refiners, and purchased from the Alliance of Automobile Manufacturers (AAM) and Alberta Research Council (ARC).

The Canadian oil industry indicates that all of their on-road diesel meets the CGSB standard for lubricity, which represents approximately 99% of the on-road diesel volume in Canada.

Purchased data is summarized in Table 5. AAM provide analysis applicable to 17 data points in Canada (branded stations) and 150 in the United States for each of summer and winter 2008. The average numbers for both countries were similar (452/390 for Canada and 432/390 for the U.S.) with the range of values for United States samples being greater than for Canada (as expected for a greater sample size). ARC data on diesel lubricity included analysis of 21 samples taken from branded stations in Canada. Values ranged from 290 to 520 with a 424 average.

**Table 5: Purchased Data on Diesel Lubricity**

		HFRR scar diameter (µm at 60°C)	
		AVG	MAX
<b>Auto Alliance Data</b> (Summer '08 / Winter '08) (17 CAN sample points, 150 U.S. samples points)	U.S.	432 / 390	580 / 679
	CAN	452 / 390	531 / 549
<b>ARC Data</b> (Winter '09)	CAN	424	520

Notes on HFRR test: Repeatability (r) = 80 µm. Reproducibility (R) = 136 µm (i.e. 460 µm ± 30%)

From the presented data, it appears that on average, all branded Canadian diesel meets or exceeds the CGSB standard for lubricity.



### **4.4.3 Data Gaps for Lubricity**

It was identified during Meeting 2 that the lubricity properties of diesel imported into Canada by non-refiner marketers are a data gap. Based on data from Environment Canada's Fuels Information Regulations, No. 1, the number of non-refiner importers of diesel varies from year to year, but the volume consistently represents around 1% of the diesel sold in Canada. In addition, a large portion of this 1% is imported into provinces that regulate the CGSB lubricity standard. Therefore, the data gap represents less than 1% of diesel sold in Canada. At the Fuel Quality Technical Working Group Meeting #3 on September 17<sup>th</sup> 2009, members agreed that no additional data needed to be collected in order to confirm the current state of Canadian fuel quality with respect to this parameter.

### **4.4.4 Environmental / Health Benefits for Lubricity:**

The workplan used to guide the development of a recommended path forward for lubricity included the following steps:

- 1) Gather available data to understand the current state of lubricity quality in Canadian diesel.
- 2) Understand the current state of U.S. federal regulations for lubricity in diesel (if applicable).
- 3) Compare the current levels of lubricity in Canadian diesel with the level federally regulated by the U.S. (if applicable), to determine if there is a quality gap.
- 4) Where a quality gap exists, determine the potential reduction to air emissions that could be achieved by filling the gap in Canadian fuel quality to meet the levels regulated in the U.S. This would require scientific evidence that demonstrates a quantitative link between lubricity and vehicle emissions.
- 5) Discussion of any other considerations.
- 6) Prepare a recommended path forward for consideration by the Minister of the Environment.

However, in Steps 2 & 3, the working group determined that with no U.S. federal regulation for lubricity (and with lubricity quality in Canadian diesel being equal to or better than U.S. quality), there is no quality gap. With no quality gap to fill, there were no potential air emission reductions to be determined in Step 4. Therefore, it was not necessary to quantify potential environmental or health benefits in order to make a recommendation on the path forward.

### **4.4.5 U.S. Considerations for Lubricity**

The U.S. EPA indicated to Environment Canada in the fall of 2009 that "EPA does not regulate diesel lubricity and instead relies on the ASTM standard for in-use control of this parameter".

### **4.4.6 Other Considerations for Lubricity**

According to NRCAN OEE Energy Use Data Handbook, in 2006, diesel represented 20% of energy use in the transportation sector. Information from Environment Canada indicates 84% of this was used in heavy-duty trucks, whereas 10% and 6% was used in medium-duty vehicles and light-duty vehicles respectively.

For the above statistics, light-duty vehicles include all cars and light trucks with a gross vehicle weight  $\leq 3855$  kg and medium-duty vehicles have a gross vehicle weight between 3856 and 4536 kg.

The World Wide Fuel Charter requires a wear scar of 400 microns or less from the HFRR test. The California Air Resources Board (CARB) stated in 2003 that current lubricity levels (of 520 microns maximum wear scar) were not adequate for future low-emissions technology (ref *CARB: Proposed Amendments to the California Diesel Fuel Regulations — Staff Report: Initial Statement of Reasons*), but to date have not implemented any changes to address this.

#### **4.4.7 Conclusions (Summary of Findings Regarding Lubricity)**

- Neither the U.S. nor Canada regulate lubricity at the federal level. As such, there is no regulatory gap between Canada and the U.S. on lubricity
- The purchased data shows that on average, the majority of branded diesel meets or exceeds the CGSB standard for lubricity. And, refiners have indicated that all of their diesel meets or exceeds the same CGSB standard.
- The CGSB standard is more stringent than the ASTM standard
- The only data gap remaining was the non-refiner importers of diesel, but this represents less than 1% of diesel sold in Canada. At Meeting #3, the working group agreed that no additional data is needed to confirm the current state of Canadian fuel quality with respect to lubricity.
- Based on presented data, the lubricity quality of Canadian diesel is at least as good as or better than that of the U.S.
- The U.S. EPA has indicated to Environment Canada in the fall of 2009 that “The EPA does not regulate diesel lubricity and instead relies on the ASTM standard for in-use control of this parameter”.

#### **4.4.8 Recommended Path Forward for Lubricity**

EC should monitor any new efforts in the U.S., but no additional action is recommended at this time because current lubricity levels are equivalent to, or better than, the U.S. Also, current lubricity levels are being managed to meet the standard defined by CGSB.

## 5. Renewable Fuel Quality Issues Raised

Some members of the working group also raised issues related to renewable fuel quality. In contrast to the 4 parameters, these are not consensus recommendations by the working group.

### ***Position tabled by CVMA (endorsed by AIAMC and CTA)***

#### *What is the Current Regulatory Situation in U.S – Canada on Renewable Fuels?*

##### **Federal Regulations:**

The U.S. EPA regulates an ethanol content cap of 10% in gasoline. This was established in 1978 through the use of a waiver that allowed for 10% blending of ethanol with gasoline. The EPA also has a 1 psi RVP flexibility allowance in order not to discourage producers from blending ethanol, as combined gasoline/ethanol RVP reacts in a non-linear fashion. Currently, Canada is developing renewable fuels regulation requiring that renewables are used but it does not have an ethanol blend level cap or RVP flexibility allowance.

In addition, through the Energy Independence and Security Act (EISA) 2007 and amendments to the Clean Air Act, the U.S. regulates overall biodiesel volume and has established authorities to allow for blend caps at B5 and B20 respectively. Canada has done neither.

##### **Canadian Provincial/Territory Regulatory Situation:**

Ontario, British Columbia, Manitoba and Saskatchewan have regulations that require ethanol in gasoline. Manitoba and British Columbia require renewable diesel fuel.

Ontario, Quebec, Manitoba and British Columbia utilize CGSB standards to regulate low level ethanol blends (E10 or less). Ontario also utilizes ASTM standards to regulate high level blends (E85). However, the other provinces and territories do not have blend caps or quality specifications for renewable blended fuels.

#### *What is the Actual Fuel Quality Gap Analysis on Renewable Fuels?*

**It is important to note that all auto companies** have been advising vehicle owners, fleet owners, fuel marketers and regulators through owners' manuals, and other direct and indirect communications, that conventional gasoline vehicles are only validated for up to E10 and for conventional diesel vehicles up to B5 blends. In addition, companies offering vehicles that are capable of handling E85 or B20 fuels clearly identify the fuel capability of the vehicles.

In terms of actual blend levels currently found in Canada, the Alliance Fuel Survey Data (Winter 2009) shows for conventional fuels;

- Ethanol/Gasoline blends with up to 10% ethanol in the U.S, and Canada.
- Biodiesel blends with up to 9.7% FAME (Fatty Acid Methyl Esters) in the U.S. and 1.2% in Canada

The July 20, 2009 comments submitted by the Alliance of Automobile Manufacturers regarding the application to the U.S. EPA to grant a waiver for E15 fuel outlines the environmental and operability risks associated with ethanol blends above E10 and

therefore, highlights the necessity for a regulated E10 blend cap on low-level blends of ethanol in gasoline under the Canadian renewable fuels regulations. The Alliance submission<sup>13</sup> was previously distributed to the Technical Working Group members.

Similarly, the same potential risk exists for low-level biodiesel blends, which must be capped at 5% (B5).

Any policies or regulations associated with blend levels must also include provisions to facilitate the sale of ethanol fuels (E85) as well as high concentration biodiesel blends (B20) for use with ethanol Flexible Fuel Vehicles and B20-validated vehicles, respectively.

#### **What are the Renewable Fuel Regulatory and Data Gaps?**

The U.S. EPA specified an ethanol blend cap due to the negative environmental impacts of blends exceeding 10% ethanol.

Currently, there is insufficient scientific evidence to demonstrate that there would be no significant impact to the environment or vehicle operation or both to support the deployment of a greater content of ethanol beyond E10.

The Alliance comments referenced above effectively illustrate the necessity for maintaining U.S. maximum blend level of E10 and establishing Canadian blend level maximum of 10% for conventional gasoline vehicle use.

Due to the climate issues in Canada (cold weather), elevated cloud points that are typical of biodiesel creates unique technological challenges that practically limit the biodiesel blend levels to B5 or less for conventional diesel vehicles. The seasonal bio fuel component maximum that can be used is entirely linked to the climatic conditions. This condition impacts the biodiesel upper blend levels for year around use.

#### **What are the Environmental / Health Benefits of Renewable Fuels?**

The U.S. EPA estimated that there were negative environmental consequences (outlined in the referenced document from the Alliance) primarily due to the increased evaporative emissions associated with gasoline blended with greater than 10% ethanol concentrations in standard (i.e. non-FFV) vehicles.

There are a variety of SAE and other studies that show positive and negative impacts of various blends of biodiesel which have significant impacts on NOx and particulates. The data varies from study to study. A full technical review should be completed prior to the adoption of any biodiesel standard. The Notice of Intent to develop a federal regulation requiring renewable fuels in December 2006 required the successful completion of a study on the operability impacts before the renewable fuels regulation would be allowed to move forward based on a range of conditions. As various renewable diesel blendstocks have different characteristics, laboratory results demonstrated that not all blendstocks have equal performance in the climatic conditions experienced in Canada. While this on-road study was shown to be

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<sup>13</sup> Alliance of Automobile Manufacturers Comments on Clean Air Act Waiver Application to Increase the Allowable Ethanol Content of Gasoline to 15 percent. Submitted to U.S. Environmental Protection Agency July 20, 2009. Alliance of Automobile Manufacturers, 1401 Eye Street, N.W. Suite 900, Washington, DC, 20005.

positive special fuel handling was required to produce the outcome achieved in the field. This level of specialized fuel handling is neither available nor practical.

#### **What are the Other Considerations?**

Operational and environmental issues exist with standard (i.e. non-B20 capable) diesel engines operating on blends exceeding 5%. B20-validated vehicles can operate on biodiesel blends up to and including 20%.

Virtually the entire on-road fleet of gasoline light duty vehicles is only validated to operate on ethanol to a maximum of 10%. Only Ethanol Flexible Fuel Vehicles are validated to operate on ethanol blends of greater than 10%

There is a potential risk that those supplying fuel into the Canadian market could blend beyond E10 or B5 for conventional vehicles to meet overall renewable fuel requirements being established under the federal renewable fuels regulation. This same risk is also applicable to the provinces such as British Columbia.

Under the On-Road Vehicle and Engine Emissions Regulation require that vehicles are EPA certified and these vehicles are validated to a E10 maximum.

#### **What are the findings and conclusions on Renewable Fuels?**

- There is a regulatory gap between Canada and U.S. with regards to federal regulations pertaining to renewable fuels
  - ⇒ For **gasoline**, the U.S. EPA regulates an ethanol content cap of 10% (i.e. oxygenate content; capped at 2.7%); Canada does not currently cap ethanol or oxygen content of gasoline and the renewable fuels regulation under development does not have an ethanol blend cap or RVP flexibility allowance.
  - ⇒ For **diesel**, through the U.S. Energy Independence and Security Act of 2007 and amendments to the Clean Air Act regulates overall biodiesel volume and has established authorities to allow blend caps art B5 and B20 respectively. Canada has not established intentions to control biodiesel blend limits.
- CGSB has developed standards which cover fuels from E3 to E10 in gasoline. Some but not all provinces in Canada regulate CGSB standards.
- CGSB has developed standards which cover fuels from B1 to B5 biodiesel. Some but not all provinces regulate CGSB standards.
- Based on the Canada's proposed renewable fuels regulation, the potential exists that will allow gasoline blended with ethanol to be sold which will have a negative impact on air quality and vehicle operability.
- Based on the proposed renewable fuel regulation, the potential exists that will allow the biodiesel fuel to be sold that will cause operability issues that are known and environmental impacts that have not been quantified.

#### **What is the Path Forward and Recommendation to Address Concerns with Renewable Fuels?**

In the short term, Environment Canada should move immediately to regulate a 10% ethanol blend cap for gasoline as part of the renewable fuels regulation which is under development, as well as regulating a 5% blend cap for low-level blends of biodiesel. A potential approach to execute the blend level caps in the renewable fuels regulation was provided to Environment Canada; the potential changes are

highlighted in tracked format in the May 2009 working document on the renewable fuels regulation and is one potential method of implementing this requirement.

In the longer term, quality parameters of the bio-components as well as the parameters of blended fuels must be addressed in order to minimize operability (including winter operability), volatility, and environmental concerns.

*CVMA and CTA additionally recommend that the renewable fuels regulation must include provisions to facilitate the sale of ethanol fuels (E85) as well as high concentration biodiesel blends (B20) for use with ethanol Flexible Fuel Vehicles and B20-validated vehicles, respectively.*

### ***Position tabled by CPPI***

CPPI acknowledges the work presented by the CVMA. CPPI has previously stated that the Technical workgroup mandate should focus on the 4 parameters raised by the AIAMC-Pembina report, and that new concerns, such as those raised by the CVMA regarding Renewable Fuel Standard (RFS) caps can be managed more effectively via existing processes such as the joint Industry Auto-Oil Technical forum, and the CGSB, or other processes with clear and agreed upon terms of reference.

## **6. Next Steps**

The joint government-industry technical working group has completed its task. This report will be provided to the Minister of the Environment for consideration. The Oil, Gas and Alternative Energy Division will subsequently inform the members of the technical working group of the Minister's response to the report.

## 7. Annexes



## Annex 1. Technical Working Group Members

1. Alana Lavoie, Canadian Trucking Alliance
2. Amrik Rakhra, Industry Canada
3. Andrew Morin, Association of International Automobile Manufacturers of Canada
4. Brian Ahearn, Esso (Imperial Oil Limited)
5. Don Munroe, Suncor Energy, Inc.
6. Douglas Mah, Consumers' Co-operative Refineries Limited
7. Findlay Sams, Honda Canada Inc.
8. Gilles Morel, Canadian Petroleum Products Institute
9. Glenn Bryksaw, General Motors of Canada Limited
10. Gord Farrish, BMW Group Canada
11. Greg Rideout, Environment Canada
12. Indrani Hulan, Environment Canada
13. Jacques Bellavance, Shell Canada Products
14. Jacques Jobin, Ultramar Limited
15. Jane Savage, Canadian Independent Petroleum Marketers Association
16. Jay Leduc, Irving Oil Limited
17. Jean-Sébastien Borduas, Ultramar Limited
18. John-Paul Faraq, Toyota Canada Inc.
19. Keith Quach, Industry Canada
20. Ken Demchuk, Consumers' Co-operative Refineries Limited
21. Ken Mitchell, Shell Canada Limited
22. Larry Horn, Environment Canada
23. Larry Robertson, Chrysler Canada Inc.
24. Lisa Ryan, Environment Canada
25. Lisa Ward, Husky Energy Inc.
26. Marc Stuyver, Toyota Canada Inc.
27. Nigel Edmonds, Health Canada
28. Paul Simmonds, Mitsubishi Motor Sales of Canada, Inc.
29. Phil Petsinis, General Motors of Canada Limited
30. Raseeka Rahumathulla, Environment Canada
31. Rod Gillyat, Industry Canada
32. Ross White, Environment Canada
33. Ruth Talbot, Natural Resources Canada
34. Serge Lamy, Health Canada
35. Stephanie Lines, Natural Resources Canada
36. Stephen Pathak, Esso (Imperial Oil Limited)
37. Steven de Sousa, Mack Trucks Canada
38. Stuart Johnson, Volkswagen Group of America for Volkswagen Group Canada Inc
39. Wyman Pattee, Ford Motor Company of Canada, Limited
40. Yasmin Tarmohamed, Canadian Vehicle Manufacturers' Association

## **Annex 2. Technical Working Group Terms of Reference**

### **Final Terms of Reference: August 2009**

#### **1. Background**

The Government is committed to assessing the need to further control on-road fuel quality in Canada.

#### **2. Mandate**

The Technical Working Group will develop recommendations for Environment Canada with respect to the path forward for certain fuel quality parameters in Canada, in the context of benefit to the environment or to health as well as harmonization with U.S. federal regulations for fuel quality. These fuel quality parameters include but may not be limited to sulphur and deposit control additives in gasoline, and cetane and lubricity in diesel. Once recommendations have been agreed upon for these four parameters, the Technical Working Group may develop recommendations with respect to other considerations related to fuel quality.

#### **3. Objectives**

The development of the Fuel Quality Technical Working Group's recommendations will be guided by the following goals:

- Protection of human health and the environment: To achieve this goal, the Working Group will determine if there are real, quantifiable emission reductions from vehicles that will result from further controlling these fuel quality parameters. Other relevant considerations associated with modifying these parameters (e.g. a potential increase in energy intensity due to the need for additional processing of a fuel) should be noted and taken into account, where possible.
- Harmonization with U.S.: The recommendation put forward by the Working Group will be consistent with U.S. federal regulations for fuel quality.
- Creation of a pool of expertise regarding fuel quality parameters: The Working Group will provide a forum for dialogue on issues pertaining to fuel quality between the auto and fuels industries and government, giving industry the opportunity to offer advice and input to the Government on the need for, feasibility of and approach to potentially controlling certain fuel quality parameters.
- Achieving a recommendation in a timely manner: There will be a series of meetings held between July and October, 2009, with the goal of developing a recommendation to Environment Canada in October (see attached draft workplan for preliminary meeting dates and topics). Every attempt will be made to reach consensus; where a consensus can not be reached, the dissent will be noted.
  - To support the mandate of the Working Group, members will complete specific tasks (including any additional studies that may need to be completed) or provide information. They will provide agreed-to deliverables 1 week before and present the information during the meetings at which those deliverables will be discussed. This will provide other members time to review the deliverables and prepare any comments to table at the meeting.
  - The following guidelines will apply during Technical Working Group meetings:

- all members of the Working Group will have equal status during discussions;
- members will be urged to find common ground rather than engage in positional debates;
- If there is a cost associated with the completion of any deliverable, the Technical Working Group will explore the possibility of cost-sharing.

#### **4. Members & Chair**

##### ***Members***

- The Fuel Quality Technical Working Group will consist of participants representing auto manufacturers, petroleum refiners and marketers and federal government departments.
- Members of the Fuel Quality Technical Working Group are expected to participate constructively in this process.
- All members are responsible for bringing the outcomes of the Technical Working Group back to their constituencies or members.

##### ***Chair***

- The Technical Working Group will be chaired by a representative from the Oil, Gas & Alternative Energy Division of Environment Canada.
- During Working Group meetings, the Chair will ensure that meetings adhere to the objectives outlined in this Terms of Reference, keep time, foster an environment for members to listen and engage in productive discussions with each other and with departmental representatives, and steer the meeting towards productive results.

## Annex 3. Technical Working Group Workplan

Tasks to Support Each TWG Meeting	Deliverable	Responsible for Deliverable	Meeting 1- Aug 5 Finalize TOR & Workplan	Meeting 2- Aug 25 Determine current state	Meeting 3- Sep 17 Gap Analysis	Meeting 4- Sep 30 Effects on Air Emissions	E-Mail- Oct 19 Straw Dog Recommendation	Meeting 5 - Oct 30 Draft Recommendation	update - TBD Final Recommendation
<b>Meeting 1: Kick-off (Location: Ottawa &amp; teleconference)</b>									
<b>Purpose:</b> To finalize the ToR and Workplan, and identify volunteers for each deliverable	1. Develop Terms of reference for the TWG	Environment Canada	X						
	2. Draft Workplan for the TWG	Environment Canada	X						
<b>Meeting 2: Current State (Location: Toronto &amp; teleconference)</b>									
<b>Purpose:</b> To understand the current state of fuel quality in Canada, and the current state of Federal regulations in the US, and compare the two. This will allow the TWG to perform an analysis to identify if there is a gap to be filled in order to harmonize Canada's fuel quality with US fuel quality regulations. If a gap in <u>fuel quality</u> is identified, the associated gap in Canadian regulation can also be discussed.	3. Document that clearly summarizes the state of actual fuel quality in Canada for each of the four parameters (i.e. does all fuel - from each refinery- meet the CGSB standard for DCAs, lubricity & cetane or the sulphur regulations. If not, how much doesn't comply and what level is it at).	Gilles Morel (CPPI), Jay Leduc (Irving Oil) & Ken Demchuck (CCRL)		X					
	<b>ADDED</b> To look into existing, purchasable data that summarizes the state of actual fuel quality in Canada	Environment Canada		X					
	4. Document that shows the state of Federal regulations in the US for each of the 4 parameters	Environment Canada		X					
	5. Document that shows the state of federal and provincial regulations in Canada for each of the 4 parameters	Environment Canada		X					
	<b>ADDED</b> Document that summarizes the current state of vehicle combustion technology in Canada	CVMA		X					
<b>Meeting 3: Gap Analysis (in context of harmonization with US) (Location: Ottawa &amp; teleconference)</b>									
<b>Purpose:</b> To discuss and agree upon the gap between current <u>physical</u> Canadian fuel quality and the US federal regulations on fuel quality.	6. Document that uses the discussion from Meeting 2 to summarize the current gap between Canadian fuel quality and federally regulated fuel quality in the US. Includes an analysis on the gaps in Canadian fuel quality regulation that would need to be addressed in order to harmonize fuel quality with US federal regulations.	Environment Canada			X				
	<b>ADDED</b> Document that identifies topics of concern with respect to renewable fuels	CVMA			X				
<b>Meeting 4: Impact on air emissions associated with filling the gap</b>									
<b>Purpose:</b> To discuss and agree upon the effect that filling the gap between current Canadian fuel quality and US federally regulated fuel quality would have on air emissions in Canada.	7. Documentation (reports, studies, etc.) on existing science to demonstrate that there is or is not a link between each parameter and air emissions, and impacts on emissions resulting from changing each parameter.	Andrew Morin (AIAMC)				X			
	8. Draft results from literature search on existing science linking the 4 parameters to emission reductions.	Environment Canada & Health Canada				X			

Tasks to Support Each TWG Meeting	Deliverable	Responsible for Deliverable	Meeting 1- Aug 5 Finalize TOR & Workplan	Meeting 2-Aug 25 Determine current state	Meeting 3-Sep 17 Gap Analysis	Meeting 4-Sep 30 Effects on Air Emissions	E-Mail-Oct 19 Straw Dog Recommendation	Meeting 5 - Oct 30 Draft Recommendation	update - TBD Final Recommendation
	<b>ADDED</b> To identify and discuss potential elements for a draft recommendation on the path forward for each parameter, and to identify other considerations that should be reflected.	All				X			
<b>ADDED: Circulation By E-mail - Draft "Straw Dog" Recommendations for consideration by TWG members</b>									
<b>Purpose:</b> To circulate straw dog draft recommendations for each parameter, developed by small group formed during Meeting 4. These will be reviewed by TWG members for comment, and revised versions will be discussed at the October 30th meeting.	a) Sulphur in Gasoline	Yasmin Tarmohamed, Andrew Morin, Gilles Morel, Brian Ahearn, Ruth Talbot and EC					X		
	b) Cetane Number in Diesel	Gord Farrish, Wyman Pattee, Yasmin Tarmohamed, Brian Ahearn and EC					X		
	c) Lubricity in Diesel	Glenn Bryksaw, Yasmin Tarmohamed, Andrew Morin, Ken Mitchell and EC					X		
	d) DCAs in Gasoline	Yasmin Tarmohamed, Findlay Sams, Glenn Bryksaw and Environment Canada					X		
<b>Meeting 5: Draft recommendation (or final - if possible)</b>									
<b>Purpose:</b> To discuss the draft recommendation on the path forward for each parameter, and identify changes that are required.	13. Draft recommendation for sulphur in gasoline	All						X	
	14. Draft recommendation for cetane number in diesel	All						X	
	15. Draft recommendation for lubricity in diesel	All						X	
	16. Draft recommendation for DCAs in gasoline	All						X	
	17. Table concerns with regards to renewable fuels	Interested members							X
<b>Update (via email): Final recommendation (if needed)</b>									
<b>Purpose:</b> To finalize the TWG recommendation on path forward for each parameter.	18. Incorporate comments received at Meeting 5 and prepare final recommendations.	Environment Canada							X

**Annex 4. Technical Working Group Meeting Agendas and Notes**

## **Meeting 1 – August 5, 2009**

### **AGENDA – MEETING #1**

**August 5, 2009**

**10:00 am – 12:00 pm (ET)**

**Location: Gatineau, QC**

**Conference Call Dial-In Number: 1-866-817-2869**

**Conference Code: 5565691**

- 10:00 – 10:15 1) Introductions and Review of Draft Agenda**
- i. Introductions
  - ii. Review of draft agenda
- 10:15 – 10:35 2) Finalize the Terms of Reference for the Technical Working Group**
- i. Review the Terms of Reference
  - ii. Comments on the Terms of Reference
  - iii. Agreement on the Terms of Reference
- 10:35 – 11:15 3) Finalize the Workplan for the Technical Working Group**
- i. Review the Workplan
  - ii. Comments on the Workplan
  - iii. Agreement on the Workplan
- 11:15 – 11:40 4) Assign Deliverables (#3 through #17) for Remaining Meetings**
- Please come prepared to sign up for specific deliverables during this first meeting. Also, please note that most deliverables will be sub-divided into the 4 parameters of interest: Lubricity, Cetane, DCAs, and Sulphur. As such, you will have the option of signing up for a task specifically as it relates to one of the parameters.*
- 11:40 – 11:50 5) Finalize Dates & Venues for Subsequent Meetings**
- Meetings #2 through 6
- i. Date confirmation
  - ii. Length of each meeting
  - iii. Venue (teleconference or face-to-face)
- 11:50 – 12:00 6) Other items (if any are identified), Or summary and next steps**

## **MINUTES – MEETING #1**

### **Attendees**

#### **In Person**

Gilles Morel	CPPI
Jacques Bellavance	Shell Canada Products
Don Munroe	Suncor
Marika Egyed	Health Canada
Nigel Edmonds	Health Canada
Michelle Raizenne	Environment Canada
Indrani Hulan	Environment Canada
Lisa Ryan	Environment Canada
Ross White	Environment Canada
Larry Horn	Environment Canada

#### **Via Teleconference**

Glenn Bryksaw	General Motors
Larry Robertson	Chrysler
Wyman Pattee	Ford
Yasmin Tarmohamed	CVMA
Gord Farrish	BMW
Stuart Johnson	Volkswagen
Findlay Sams	Honda Canada Inc.
Marc Stuyver	Toyota Canada Inc.
Paul Simmonds	Mitsubishi
Andrew Morin	AIAMC
Alana Lavoie	Canadian Trucking Alliance
Lisa Ward	Husky Energy
Ken Mitchell	Shell Canada Ltd.
Jacques Jobin	Ultramar
Jean-Sébastien Borduas	Ultramar
David MacMillan	Suncor
Bruce Cater	Suncor
Jay Leduc	Irving Oil
Ken Demchuk	CCRL
Ruth Talbot	Natural Resources Canada
Jean-Luc Matteau	Natural Resources Canada
Greg Rideout	Environment Canada
Keith Quach	Industry Canada
Amrik Rakhra	Industry Canada

### **Terms of Reference for the Technical Working Group**

- EC stressed the key elements of the Terms of Reference for the Technical Working Group on Fuel Quality: The working group will develop a recommendation on the **path forward** for sulphur and deposit control additives in gasoline and cetane and lubricity in diesel, in the **context of harmonization with the US** and with respect to **environmental or health benefits** found from further control the four parameters.
- CVMA suggested adding the clarification that the working group is assessing the need to further control **on-road** fuel quality in Canada. CVMA also suggested adding a sentence to the mandate to allow for the recommendation to include other considerations (to be looked at after a recommendation is achieved on the four parameters).
- Members agreed to add a sentence to the Terms of Reference that they will explore the possibility of cost sharing, should there be any cost associated with the completion of deliverable.
- Petroleum Refineries suggested that in addition to determining if there are real, quantifiable emission reductions from vehicles that will result from further controlling these fuel quality parameters, the working group needs to consider any other relevant consideration (e.g. the potential increase in emissions from refineries should fuel need to be further processed).
- **Action Item** – Environment Canada will incorporate the above edits into the Terms of Reference

### **Workplan for the Technical Working Group: Review & Assign Deliverables**



- CVMA noted that the workplan should include a deliverable regarding the current state of vehicle combustion technology
  - **Action Item** - CVMA will complete a new Deliverable for Meeting 2 (Document that clearly summarizes the current state of vehicle combustion technology in Canada) and a new Deliverable for Meeting 5 (Document that clearly summarizes any update (since Meeting 2) to the current state of vehicle combustion technology in Canada).
- Members discussed methods to obtain the most current information reflecting the current state of fuel quality in Canada. Petroleum Refiners confirmed that they should be able to produce data reflecting the current state of fuel quality from Canadian refineries. Suggestions were made to look at the fuel quality survey data available from the Alberta Research Council and the Auto Alliance.
  - **Action Item** – CPPI, Irving Oil and CCRL to complete Deliverable 3 for Meeting 2 (Document that clearly summarizes the state of actual fuel quality in Canada, for each of the four parameters).
  - **Action Item** – Environment Canada to contact Canadian Independent Petroleum Marketers association (CIPMA) to see if they can collaborate on Deliverable 3.
  - **Action Item** – Environment Canada to assess the type of information available from and feasibility of purchasing data that reflects the current state of Canadian fuel quality.
- Agreement on Remaining Deliverables:
  - **Action Item** – Environment Canada to complete Deliverable 4 for Meeting 2 (Document that shows the state of Federal regulations in the US for each of the 4 parameters)
  - **Action Item** – Environment Canada to complete Deliverable 5 for Meeting 2 (Document that shows the state of federal and provincial regulations in Canada for each of the 4 parameters)
  - **Action Item** – AIAMC to complete Deliverable 7 for Meeting 4 (Documentation (reports, studies, etc.) on existing science to demonstrate linkages between each parameter and air emissions, and impacts on emissions resulting from changing each parameter)
- Key Concerns:
  - Timing: A number of members voiced concern with regards to the tight timing in the workplan. There was agreement that in order to develop a recommendation this fall, the group will need to stay focused on the 4 parameters. Increasing the scope of the mandate may prevent the group from achieving a recommendation this fall.
  - US Harmonization: In addition to the current US federal regulations, the working group should be cognizant of changes that are planned to take effects in the near future.
  - Renewable Fuels: Renewable fuel quality is a main focus for many of the working group members. Concern that this is listed as an “other consideration”.
  - Reformulated Gasoline: AIAMC suggested evidence currently exists to show environmental or health benefits exist from reformulated gasoline. Petroleum Refiners felt that Canada is already harmonized with RFG standards.

### Dates & Venues for Subsequent Meetings

- Meeting #2 – August 25<sup>th</sup>
  - Face to Face Meeting, likely in the GTA
  - **Action Item** – Environment Canada to arrange meeting and circulate information to group
- Meeting #3 – September 17<sup>th</sup>
- Meeting #2 – August 25<sup>th</sup>
  - Teleconference Meeting (to be held in Gatineau for anyone who wants to attend in person)
- Meeting #3 – September 30<sup>th</sup>

### Other Items

**Action Item** – Canadian Trucking Alliance to propose the addition of a Technical Working Group Member to represent heavy-duty engine manufacturers

## Meeting 2 – August 25, 2009

### AGENDA – MEETING #2

August 25, 2009

1:00 pm – 4:30 pm (ET)

Conference Call Dial-In Number:  
1-866-817-2869

Conference Code: 5565691

Location:

Four Points by Sheraton Toronto Airport  
Georgian Hall  
6257 Airport Road  
Mississauga, ON

- 1:00 – 1:15**      **1) Introductions and Review of Draft Agenda**  
i. Introductions  
ii. Review of draft agenda
- 1:15 – 1:30**      **2) Follow-Up to August 5<sup>th</sup> Meeting**  
i. Review minutes and action items from last meeting  
ii. Review the final Terms of Reference
- 1:30 – 1:50**      **3) New Deliverable: Current State of Vehicle Combustion Technology (CVMA)**  
i. Presentation of Deliverable  
ii. Comments on the Deliverable
- 1:50 – 2:20**      **4) Deliverable 4: Current State of US Federal Regulations & Deliverable 5: Current State of Canadian Federal & Provincial Regulations (*Environment Canada*)**  
i. Presentation of Deliverable  
ii. Comments on the Deliverable
- 2:20 – 3:00**      **5) Deliverable 3: Current State of Actual Fuel Quality in Canada**  
**a) Information from Refiners (*Gilles Morel - CPPI, Jay Leduc - Irving Oil, Ken Demchuk - CCRL*)**  
i. Presentation of Deliverable  
ii. Comments on the Deliverable  
**b) Information on Current State of Sulphur in Canada (*Environment Canada*)**  
i. Presentation  
ii. Comments  
**c) Update on Environment Canada's inquiry into existing, purchasable data that summarizes the state of actual fuel quality in Canada**
- 3:00 – 3:15**      **Break**
- 3:15 – 3:45**      **6) Discussion on Deliverables #3, 4, 5 → Gap Analysis**  
*Discussion of the information presented in deliverables 3, 4 & 5 and the ensuing deliverable to summarize the current gap between Canadian fuel quality and federally regulated fuel quality in the US*
- 3:45 – 4:15**      **7) Finalize Workplan**  
i. Review additions to workplan  
ii. Other comments on workplan  
iii. Finalize Workplan
- 4:15 – 4:20**      **8) Finalize Dates & Venues for Subsequent Meetings**  
Meetings #3 through 6  
i. Date confirmation  
ii. Length of each meeting  
iii. Venue (teleconference or face-to-face)
- 4:20 – 4:30**      **9) Other items (if any are identified), Or summary and next steps**

## MINUTES – MEETING #2

### Attendees

#### In Person

Glenn Bryksaw	General Motors
Phil Petsinis	General Motors
Larry Robertson	Chrysler
Wyman Pattee	Ford
Yasmin Tarmohamed	CVMA
Gordon Farrish	BMW
Marc Stuyver	Toyota Canada Inc.
Paul Simmonds	Mitsubishi
Andrew Morin	AIAMC
Gilles Morel	CPPI
Brian Ahearn	Imperial Oil
Stephen Pathak	Imperial Oil
Jacques Bellavance	Shell Canada Products
Don Munroe	Suncor Energy
Jay Leduc	Irving Oil
Dan Wispinski	Alberta Research Council
Marika Egyed	Health Canada
Ruth Talbot	NRCan
Stephanie Lines	NRCan
Indrani Hulan	Environment Canada
Lisa Ryan	Environment Canada
Ross White	Environment Canada

#### Via Teleconference

Terry Ostan	General Motors
Stuart Johnson	Volkswagen
Alana Lavoie	Canadian Trucking Alliance
Lisa Ward	Husky Energy
Ken Mitchell	Shell Canada Ltd.
Jacques Jobin	Ultramar
Greg Rideout	Environment Canada
Pierre Sylvestre	Environment Canada
Keith Quach	Industry Canada

### Introduction, Review of Agenda and Key Concerns

- Environment Canada summarized the working group’s success to date – the formation of the group, a finalized terms of reference, and starting work towards developing a recommendation for the Minister.
- Environment Canada also responded to the concerns raised at and since the August 5<sup>th</sup> meeting, by pointing out the flexibility in the current process and how it can address the concerns:
  - **Concern re: Timing-** Although timing is tight, the group needs to recommend a ‘path forward’. If the situation is clear for any parameter, we can make a recommendation on a specific path forward. Or, if we need more information or time for analysis on a given parameter – we can incorporate that into the recommended path forward.
  - **Concern re: Harmonization with US -** We shouldn’t look at this as limiting. Our recommendation must be in context of harmonization with the US. But, if the group agrees to explore going further than what the US is currently doing on a particular parameter (because we have the evidence that environmental or health benefits could be achieved), our recommendation can reflect that, as long as it includes “working with the US” to move forward on that parameter in parallel with them, so that we maintain harmonization.
  - **Renewable Fuel Quality -** We have been tasked by the Minister to look at the 4 parameters. So, although we have also committed that this is the forum to discuss renewable fuel quality issues, we must complete our work on the 4 parameters first. But, we have flexibility. For example, if the group agrees that a particular parameter is not a priority or if we can make a recommendation quickly on any of the parameters, then we can move on to renewable fuel quality right away.

- EC asked members if they have any concerns with the process itself (that is, using the Technical Working Group to develop a recommendation for our Minister on these parameters). No comments were made.
- A broad discussion occurred during which CVMA expressed that the working group should focus on renewable fuel quality, and they do not support the claim that the four parameters identified in the AIAMC report are the most important parameters to study. CPPI originally expressed that the technical working group was not the right forum to discuss renewable fuels (or if renewable fuel quality is to be addressed in this working group, that more players should be involved (for example the renewable fuel producers).
- EC clarified that the Minister tasked us with developing a recommendation on the 4 parameters in context of harmonization with the US and benefit to the environment or to health. As well, this technical working group is also the forum to raise renewable fuel quality issues (but after the work on the 4 parameters is completed).

At this point, the discussion was put on hold so that the meeting could continue. As a result of the discussion, and through assessment of the data presented in the rest of the meeting, the following conclusions were reached by the end of the meeting:

- Technical Working group members agreed that enough information is available to start drafting recommendations for at least some of the parameters in the next meeting.
- If this is possible, it would allow the group to start working on renewable fuel quality (in parallel with any remaining tasks to conclude on recommendations for the 4 parameters).
- The working group's objective for a recommendation on a path forward for renewable fuel quality would like be to work together to compile a complete list of issues associated with renewable fuel quality, and make a recommendation that prioritizes these issues for further work.
- Group members agreed on a tentative agenda for the next meeting, which includes:
  - Discussion of summarized data presented to-date (preliminary gap analysis)
  - Preliminary discussion on recommendations for the 4 parameters
  - Identification of next steps / data gaps to finalize those recommendations
  - Begin discussion on renewable fuel quality issues (by discussing a preliminary list of issues)

## Data Presented

- CVMA presented the new Deliverable for Meeting 2 (Document that shows the current state of vehicle combustion technology)
- EC presented Deliverables 4 (Document that shows the state of Federal regulations in the US for each of the 4 parameters) and 5 (Document that shows the state of federal and provincial regulations in Canada for each of the 4 parameters)
  - EC gave a summary of a July 29<sup>th</sup> meeting between Environment Canada and the US EPA.
  - **Action Item** – Environment Canada will contact colleagues from the US EPA to verify:
    - if EC can circulate the summary notes from the July 29th meeting with the US EPA
    - if the US EPA has any documents containing evidence that link DCAs to environmental or health benefits
    - *Note of clarification:* in the summary of EC's meeting with the US EPA, EC meant to convey that lower sulphur (~10ppm) gasoline is already available in parts of California, not that it is regulated in California (CaRFG Phase 3 calls for 20 ppm flat rate for sulphur or 15 ppm average with 30 ppm maximum)
  - *Note* – a clarification was made that the US EPA's regulation for cetane index. The intent was to cap aromatics content at 35%. A minimum cetane index of 40 is an alternate method of measuring / achieving the aromatics content limit.

- CPPI, Irving Oil, EC on behalf of CCRL, and Environment Canada presented information pertaining to Deliverable 3 (Document that clearly summarizes the state of actual fuel quality in Canada, for each of the four parameters).
  - Data from CPPI was missing information from some association members.
  - **Action Item** – Gilles Morel (CPPI) to circulate information on DCAs from remaining association members when available and circulate to the working group
- Dan Wispinski (Alberta Research Council) presented information pertaining to Deliverable 3 - 2009 Canadian fuel survey data for sulphur, DCAs (unwashed gums surrogate), cetane number and lubricity (HFRR wear scar surrogate). Items to note from the Alberta Research Council:
  - ARC aims to provide unbiased 3<sup>rd</sup> party data on fuel quality
  - Historically, no independent fuel is surveyed because they don't typically commission the ARC to sample fuel
  - The data is a snapshot in time and as such has statistical limitations. Data from one year would not be adequate to assume patterns in fuel quality. However, ARC has been sampling data for more than 20 years; repeated testing with consistent results provides confidence in data.
  - The HFRR surrogate for lubricity has recognized limitations (repeatability of 80 and reproducibility of 136).
  - Data presented by the research council suggests that on an average basis, the fuel sampled is meeting either the regulatory specifications or the applicable standards, and in some cases exceeds (as in the case of cetane number where all diesel sampled had a cetane number higher than 40).
- Environment Canada presented information pertaining to Deliverable 3 – data from the Automobile Alliance Manufacturers North American Fuel Survey for 2008. Data from this survey consisted of Canadian and US national values for sulphur, DCAs (unwashed gums surrogate), cetane number and cetane index and lubricity (HFRR wear scar surrogate). Items to note from the Auto Alliance data:
  - **Action Item** – Environment Canada to circulate the website for the Alliance of Automobile Manufacturers North American Fuel Survey so that members can look at survey sampling and testing details, if interested: [http://www.pcxhost.com/sdata/assets/3/313/page\\_31397.pdf](http://www.pcxhost.com/sdata/assets/3/313/page_31397.pdf),

### **Discussion on Deliverables 3, 4 and 5 and Next Steps**

- See “meeting conclusions” summarized in the Introduction, Review of Agenda and Key Concerns section
- General agreement that refinery branded fuel quality meets CGSB standards (whether produced or imported), but the same level of assurance is not there for independently marketed fuel (whether imported or domestically purchased). This concern mainly applies to DCAs (added at terminals) and independently purchased imported diesel for cetane and lubricity, because specs for the other parameters are met at refineries. This information gap needs to be filled.
- **Action Item** – Environment Canada to contact Canadian Independent Petroleum Marketers association (CIPMA) to check on progress of collecting information from their members on DCAs added at independent terminals, and to request information from their members on cetane and lubricity for imported diesel.
- **Action Item** - Environment Canada to begin Deliverable 6 (Document that uses the discussion from Meeting 2 to summarize the current gap between Canadian fuel quality and federally regulated fuel quality in the US). The preliminary gap analysis will include a discussion on the gap between:
  - actual Canadian fuel quality and US federal regulations
  - Canadian federal and provincial regulations and US federal regulations
- **Action Item** – CVMA to circulate electronic copies of documents brought to the meeting:
  - CRC Report No. E-84 “Review of Prior Studies of Fuel Effects on Vehicle Emissions” (August 08)

- Alliance of Automobile Manufacturers “National Clean Gasoline” An Investigation of Costs and Benefits” (June 09)
- Alliance of Automobile Manufacturers Comments to US EPA regarding the ‘Clean Air Act Waiver Application to Increase the Allowable Ethanol Content of Gasoline to 15 Percent’ (July 09)
- **Action Item** – CVMA will complete a new Deliverable for Meeting 3 (Document that clearly identifies topics of concern with respect to renewable fuels)

#### **Other items**

- **Action Item** – Alana Lavoie (CTA) will propose the addition of a TWG member to represent the heavy-duty engine manufacturers

#### **Dates & Venues for Subsequent Meetings**

- Meeting #3 – September 17<sup>th</sup>
  - Teleconference Meeting (to be held in Gatineau for anyone who wants to attend in person)
  - **Action Item** – Environment Canada to arrange meeting and circulate information to group
- Meeting #4 – September 30<sup>th</sup> (likely face-to-face)

## **Meeting 3 – September 17, 2009**

### **AGENDA – MEETING #3**

September 17, 2009

1:00 pm – 5:00 pm (ET)

Conference Call Dial-In Number: 1-866-817-2869

Conference Code: 5565691

- 1:00 – 1:15**      **1) Introductions and Review of Draft Agenda**  
iii. Introductions  
iv. Review of draft agenda
- 1:15 – 1:45**      **2) Technical Working Group Operation**  
i. Discussion on Process  
ii. Process Recommendation from EC  
iii. Finalize dates and venues for subsequent meetings (Meetings #4 through 6)
- 1:45 – 2:00**      **3) Follow-Up to August 25<sup>th</sup> Meeting**  
iii. Review minutes and action items from last meeting
- 2:00 – 2:30**      **4) Continuation of Deliverable 3: Current State of Fuel Quality in Canada**  
i) Presentation of Remaining Information from CPPI (*Gilles Morel*)  
ii) Presentation of Information from CIPMA (*Environment Canada*)
- 2:30 – 4:00**      **5) Preliminary Gap Analysis (*Environment Canada*)**  
i) Presentation of Gap Analysis Documents for each parameter  
ii) Discussion:  
    o Do we have a common understanding of the gap analysis?  
    o What information is missing?  
iii) Next steps in order to make a recommendation on each parameter
- 4:00 – 4:45**      **6) New Deliverable: Renewable Fuels - Topics of Concern (*CVMA*)**  
i. Presentation  
ii. Next Steps
- 4:45 – 5:00**      **7) Closing Discussion**  
i. Meeting Debrief:  
    o What went well today?  
    o What could have been better / what to do differently next time?  
ii. Decision on EC's suggestion for working group process  
iii. Reminder of deliverables for upcoming meetings  
iv. Summary & Next Steps

## **MINUTES – MEETING #3**

### **Attendees**

#### **In Person**

Alana Lavoie	Canadian Trucking Alliance
Warren Wilson	The Intersol Group
Mathieu Rouleau	Health Canada
Indrani Hulan	Environment Canada
Raseeka Rahumathulla	Environment Canada
Larry Horn	Environment Canada
Lisa Ryan	Environment Canada
Ross White	Environment Canada

#### **Via Teleconference**

Yasmin Tarmohamed	CVMA
Phil Petsinis	General Motors
Glenn Bryksaw	General Motors
Larry Robertson	Chrysler
Wyman Pattee	Ford
Andrew Morin	AIAMC
Gordon Farrish	BMW Group Canada
John Paul	Toyota Canada Inc.
Findlay Sams	Honda Canada Inc.
Steven deSousa	Mack Trucks Canada
Gilles Morel	CPPI
Lisa Ward	Husky Energy
Ken Mitchell	Shell Canada Ltd.
Jacques Bellavance	Shell Canada Products
Don Munroe	Suncor Energy
Jay Leduc	Irving Oil
Douglas Mah	CCRL
Ken Demchuk	CCRL
Rod Gillyat	Industry Canada
Ruth Talbot	NRCan
Stephanie Lines	NRCan

### **Introduction, Review of Draft Agenda & Technical Working Group Operation**

- Environment Canada requested confirmation that all working group members are committed to the process – and asked if there were concerns with the process (none were raised). EC emphasized that the recommendations from this group must reflect the views of all members – as such it is essential to have active participation from all members.
- Based on feedback from some working group members that the tone of the meetings to-date was at times not conducive to an environment where all members felt comfortable to fully participate, and that some of the meetings have been getting off-track from the agenda, Environment Canada suggested the introduction of a facilitator. The facilitator would:
  - allow Environment Canada the opportunity to more actively participate in the discussion
  - help the working group adhere to the agreed upon process
  - maintain an environment where all members are comfortable participating
- Working group members agreed to allow the proposed facilitator to observe the current meeting.
- **Action Item** – All working group members to provide Environment Canada with feedback by Tuesday, September 22<sup>nd</sup> on potentially introducing a facilitator to the September 30<sup>th</sup> working group meeting
- The following dates were agreed upon for subsequent meetings:
  - Meeting 4 – September 30 (all day) – Face to face meeting in Toronto
  - Meeting 5 – October 14 (in the afternoon) – Teleconference meeting
  - Meeting 6 – October 30 (all day) – Face to face meeting in Ottawa



## Follow-Up to August 25<sup>th</sup> Meeting

**Action Item** – Environment Canada to edit text from draft minutes from Meeting 2 to “General agreement that refinery branded fuel quality meets CGSB standards (whether produced or imported)”, based on comments received during the meeting.

## Continuation of Deliverable 3: Current State of Fuel Quality in Canada

- CPPI presented the remainder of data for the percentage of gasoline (produced and imported) sold by association members containing DCAs. Results were as follows:
  - 65% of gasoline sold by members have “TOP TIER™ Approved or equivalent Levels” of DCAs
  - 32% of gasoline sold by members have “At least CGSB levels” of DCAs
  - 3% of gasoline sold by members (~1 billion litres) are sold without DCAs – unknown if DCAs are subsequently added
  - Note that values were obtained by using the volumes reported to Environment Canada under the Benzene in Gasoline Regulations.
- An objection was raised to the use of the wording “TOP TIER™ Equivalent Levels”. CVMA noted that TOP TIER™ is trade marked, and as such, companies are either a part of TOP TIER™ or they are not.
- **Action Item** – Gilles Morel (CPPI) to change wording on spreadsheet to eliminate reference to “TOP TIER™ Equivalent Levels” and adjust percentages in modified categories accordingly. *NOTE – this action item was completed and sent to Environment Canada shortly after the meeting. Information from CPPI is as follows:*
  - 43% of gasoline sold by members have “TOP TIER™ Approved Levels” of DCAs
  - 54% of gasoline sold by members have “At least CGSB levels” of DCAs
  - 3% of gasoline sold by members are sold without DCAs – unknown if DCAs are subsequently added
- To complete the picture for all gasoline produced and imported in Canada, it will be necessary to gain the same information from the remaining refineries in Canada (Irving Oil and CCRL) and information from non-refiner independent marketers. Environment Canada presented some information from CIPMA – but the data was non-conclusive and requires follow-up to feed into the gap analysis.
  - **Action Item** – Douglas Mah (CCRL) and Jay Leduc (Irving Oil) to provide information regarding the percentage of gasoline sold from their refinery containing CGSB or higher levels of DCAs, and the percentage of gasoline sold by their refinery without DCAs.
  - **Action Item** – Environment Canada to send the spreadsheet provided by Glenn Bryksaw (GM) to Douglas Mah (CCRL) and Jay Leduc (Irving Oil) so they can add the information from their companies.
  - **Action Item** – Environment Canada to follow up with CIPMA to request further detail to the information provided by association members regarding DCAs added to gasoline sold by independent marketers (whether imported or domestically purchased).
  - **Action Item** – Environment Canada to contact AQUIP for information regarding DCAs in gasoline sold by their members.
- **Action Item** – Glenn Bryksaw (GM) to provide data on the percentage of gasoline that meets TOP TIER™ requirements in the US.

## Preliminary Gap Analysis

Environment Canada presented preliminary gap analysis for each of the four parameters:

- *Cetane in Diesel*

- Although cetane index is regulated by the US EPA, and the CGSB standard for cetane number is only regulated in Quebec, Manitoba and PEI, based on data presented there is no gap between actual cetane number in Canada and the federal regulations in the US.
- Based on information presented in the gap analysis, there is a data gap for diesel imported into Canada by non-refiner marketers. This amount represents ~1% of diesel sold in Canada. However, a large proportion of this volume is imported into provinces that regulate the CGSB cetane standard, thereby reducing the data gap to <1%.
- As well, information from CIPMA states that all imported diesel meets CGSB standards.
- **Agreement** across the working group that there are no data gaps left to be addressed before the process to develop a recommendation on the path forward for cetane can begin (other than any potential information to be received at Meeting 4 when the working group discusses potential environmental and health benefits).
- Note that CCPI does not believe there to be a regulatory gap and proposed a “No action required for cetane in diesel” recommendation. The working group decided as a whole to wait until information on potential environmental or health benefits is presented to table recommendations.
- A request was made by CVMA to include information about medium-duty diesel vehicles in Canada in the discussion of light-duty diesel vehicles in Canada.
- **Lubricity in Diesel**
  - There is no regulatory gap for lubricity – neither Canada nor the US regulate lubricity (in addition, the CGSB standard for lubricity is regulated in Quebec, Manitoba & PEI). Based on the data presented, there is no gap for actual fuel quality with respect to lubricity between Canada & US.
  - Based on information presented in the gap analysis, there is a data gap for diesel imported into Canada by non-refiner marketers. This amount represents ~1% of diesel sold in Canada. However, a large proportion of this volume is imported into provinces that regulate the CGSB lubricity standard, thereby reducing the data gap to <1%.
  - As well, information from CIPMA states that all imported diesel meets CGSB standards.
  - **Agreement** across the working group that there are no data gaps left to be addressed before the process to develop a recommendation on the path forward for lubricity can begin (other than any potential information to be received at Meeting 4 when the working group discusses potential environmental and health benefits).
- **Sulphur in Gasoline**
  - There is no regulatory gap for sulphur in gasoline between Canada and the US – both Canada and the US currently regulate sulphur to a 40ppm flat maximum or 30ppm yearly pool average with an 80ppm maximum.
    - Note there was a request to include information on the US EPA’s system of credits and waivers with respect to their sulphur regulations.
  - Based on the data presented, there is also no gap for actual fuel quality with respect to sulphur between Canada & US.
    - Note there was a request to include any data acquired from the Auto Alliance or the Alberta Research Council based on ASTM test method D-2622.
  - Note there was a request to refer to the Alliance of Automobile Manufacturers report “National Clean Gasoline” in the gap analysis.
    - **Action Item** – CVMA to identify the appropriate section of the report for EC.
  - **Agreement** across the working group that 100% of the gasoline sold in Canada meets federal regulations for sulphur and that there are no data gaps left to be addressed before the process to develop a recommendation on the path forward for sulphur can begin (other than any potential information to be received at Meeting 4 when the working group discusses potential environmental and health benefits).
- **DCAs in Gasoline**

- There is a recognized data gap for DCAs. The amount of gasoline sold by non-refiner marketers (acquired by both domestic purchase and importation) that contains DCAs in levels that meet CGSB standards is unknown. (As per the action items listed above, Environment Canada will endeavour to close the data gap by gathering information from CIPMA and AQUIP.
- Note regarding the unwashed gums surrogate for DCAs: higher levels of unwashed gums can be used to only confirm that DCAs are present in gasoline and are not adequate as the sole indicator of the presence of DCAs (>10mg/100mL usually indicates the presence of DCAs, values between 20 and 30mg/100mL may indicate the presence of TOP TIER™ gasoline). High unwashed gums can, at times, reflect contamination in the gasoline.
- **Agreement** across the working group that the data gap for DCAs is small (~2–3% of gasoline in Canada) and restricted to gasoline sold by independent non-refiner marketers.
- Concern was raised that even if the data gap is small, persistent vehicle consumption of gasoline not containing CGSB or higher levels of DCAs can cause performance issues. Warranty claim information was requested to verify if there has been a persistent problem, but CVMA indicated that these types of issues would not be evident in warranty claims. Any problems associated with inadequate levels of DCAs may appear as driveability issues first, with other issues becoming apparent with time.
- CPPI noted that they will not be part of a recommendation that may touch on their competition clause.
- **Action Item** – All working group members to share any additional comments on the gap analyses with the rest of the working group (by e-mail) by Thursday, September 24<sup>th</sup>.
- **Action Item** – Environment Canada to edit gap analyses (based on comments received during the meeting, comments received by email, and with additional data), and circulate updated drafts before September 30<sup>th</sup> meeting.

### **New Deliverable: Renewable Fuels – Topics of Concern**

- CVMA gave a presentation on renewable fuels topics of concern. They highlighted their immediate / key concerns with regards to renewable fuel quality are (as outlined in the CVMA presentation):
  - “DO NOT exceed 10% ethanol in gasoline for non flex-fuel vehicles (FFVs)”
  - “DO NOT exceed 5% biodiesel as operability concerns do exist for diesel vehicles that are not validated for B20”
- **Action Item** – Environment Canada offered to pass this message to colleagues currently working on the Renewable Fuels Regulations file.
- CPPI indicated that while they generally agree with the viewpoint expressed by CVMA, they do not believe that the Renewable Fuels Regulations is the appropriate tool to deal with the concern
- **Action Item** – All working group members to prepare information on renewable fuel quality key areas of concern (if interested)

### **Closing Discussion & Other Items**

- No objections were raised to the inclusion of a facilitator to subsequent meetings (but members will email concerns by Tuesday September 22<sup>nd</sup>, if any exist). AIAMC voiced that a facilitator could be of value to ensure an open tone at future meetings.
- **Action Item** – All working group members to consider what went well / what could be improved at today’s meeting, for feedback at the September 30<sup>th</sup> meeting.
- **Action Item** – All working group members to develop information on “Other Considerations” to present at September 30<sup>th</sup> meeting, or at the October 14<sup>th</sup> meeting (if interested)

## Meeting 4 – September 30, 2009

### AGENDA – MEETING #4

September 30, 2009

9:30 am – 4:00 pm (ET)

Conference Call Dial-In Number:

1-866-817-2869

Conference Code: 5565691

Location:

Four Points by Sheraton Toronto Airport

Conference Room - Caledon

6257 Airport Road

Mississauga, ON

9:30 – 9:45

#### 1) Introductions and Review of Draft Agenda

- i. Introductions
- ii. Review of draft agenda

9:45 – 10:00

#### 2) Follow-Up to September 17<sup>th</sup> Meeting

Purpose: To confirm the minutes and next steps action items from meeting 2

- i. Review minutes and action items from last meeting

10:00 – 11:00

#### 3) Deliverable 7: Evidence of link between parameters & emissions

Purpose: To demonstrate existence and enhance understanding of links between the parameters & emissions

- i. Presentation (AIAMC)
- ii. Discussion
  - o What does the evidence suggest?
  - o What are the implications?
  - o What are the data gaps? Are they significant?

11:00 – 11:15

#### Break

11:15 – 11:45

#### 4) Deliverable 8: Evidence of link between parameters & emissions

Purpose: To give an update on the progress of an Environment Canada contract to identify and critically review existing literature on the links between the parameters & emissions.

11:45 – 12:30

#### 5) Sulphur

- i. Presentation of updated gap analysis document for sulphur (EC)
- ii. Discussion:
  - o Do we have a common understanding of the gap analysis (fuel quality, regulatory environment comparisons, etc.)?
  - o What are the data gaps? Are they significant?
- iii. What are the emerging elements of a recommendation on a path forward for sulphur?
  - o Based on this gap analysis document and the evidence presented in agenda item 3, are there elements of recommendations for sulphur that we can agree upon today?
  - o If there are any data gaps, how do they factor into the potential elements of a recommended path forward?

12:30 – 1:15

#### LUNCH

1:15 – 1:45

#### 6) Cetane

- i. Presentation of updated gap analysis document for cetane (EC)
- ii. Discussion:
  - o Do we have a common understanding of the gap analysis (fuel quality, regulatory environment comparisons, etc.)?

- What are the data gaps? Are they significant?
- iii. What are the emerging elements of a recommendation on a path forward for cetane?
  - Based on this gap analysis documents and the evidence presented in agenda item 3, are there elements of recommendations for cetane that we can agree upon today?
  - If there are any data gaps, how do they factor into the potential elements of a recommended path forward?

**1:45 – 2:15**

**7) Lubricity**

- i. Presentation of updated gap analysis documents for lubricity (EC)
- ii. Discussion:
  - Do we have a common understanding of the gap analysis (fuel quality, regulatory environment comparisons, etc.)?
  - What are the data gaps? Are they significant?
- iii. What are the emerging elements of a recommendation on a path forward for lubricity?
  - Based on this gap analysis document and the evidence presented in agenda item 3, are there elements of recommendations for cetane that we can agree upon today?
  - If there are any data gaps, how do they factor into the potential elements of a recommended path forward?

**2:15 – 3:00**

**8) DCAs**

- i. Compilation of DCA information from majors (Environment Canada)
- ii. Results of data gathering efforts from CIPMA & AQIP (EC)
- iii. Presentation of updated gap analysis documents for DCAs (EC)
- iv. Discussion:
  - Do we have a common understanding of the gap analysis (fuel quality, regulatory environment comparisons, etc.)?
  - What are the remaining data gaps? Are they significant?
- v. What are the emerging elements of a recommendation on a path forward for DCAs?
  - Based on this gap analysis documents and the evidence presented in agenda item 3, are there elements of recommendations for cetane that we can agree upon today?
  - If there are any data gaps, how do they factor into the potential elements of a recommended path forward?

**3:00 – 3:30**

**9) Other Items**

- i. Renewable Fuel Quality: Are there elements of a recommendation with respect to renewable fuel quality that we can agree upon today?
- ii. Any other items

**3:30 – 4:00**

**10) Closing Discussion**

- i. Reminder of deliverables for upcoming meetings
- ii. Summary & Next Steps
- iii. Meeting Debrief:
  - What went well today?
  - What could have been better / what to do differently next time?

## **MINUTES – MEETING #4**

### **Attendees**

#### **In Person**

Glenn Bryksaw	General Motors
Larry Robertson	Chrysler
Wyman Pattee	Ford
Yasmin Tarmohamed	CVMA
Gordon Farrish	BMW
Marc Stuyver	Toyota Canada Inc.
Findlay Sams	Honda Canada Inc.
Andrew Morin	AIAMC
Ovi Colavincenzo	AIAMC
Gilles Morel	CPPI
Brian Ahearn	Imperial Oil
Stephen Pathak	Imperial Oil
Jacques Bellavance	Shell Canada Products
Don Munroe	Suncor Energy
Ken Mitchell	Shell Canada Ltd.
Jane Savage	CIPMA
Serge Lemy	Health Canada
Ruth Talbot	NRCan
Indrani Hulan	Environment Canada
Lisa Ryan	Environment Canada
Raseeka Rahumathulla	Environment Canada
Warren Wilson	For EC

#### **Via Teleconference**

Steven DeSousa	Mack Trucks Canada
Tony Macerollo	CPPI
Lisa Ward	Husky Energy
Jacques Jobin	Ultramar
Jay Leduc	Irving Oil
Ken Demchuk	CCRL
Larry Horn	Environment Canada
Rod Gillyat	Industry Canada
Amrik Rakhra	Industry Canada

### **Introduction, Review of Agenda, Key Concerns**

- Environment Canada confirmed that based on some objection to the idea, a facilitator would not be hired to chair or moderate meetings. EC will continue to play this role, but asked that working group members help by creating an environment that is conducive to everyone participating, and by sticking to the agendas.
- EC also recognized concern from the working group that the technical working group process needs to be as efficient as possible. As such, and based on the progress the group has made to date, EC proposed that the working group may be able to start identifying potential elements of recommendations on the path forward for each of the four parameters today (Sept 30 meeting). If this exercise is successful, small groups could be formed to draft “straw dog” recommendations for circulation via e-mail to all the members of the working group. This may eliminate the need for Meeting #5 (scheduled for October 15<sup>th</sup>).
  - ⇒ Working group members were asked to consider the parameters for which they would be interested in participating in the small groups
  - ⇒ General agreement with this proposal. Working group decided to wait until the end of today’s meeting (Sept 30 meeting), to determine need for Meeting 5 (based on how much progress is made).
- It was noted that some of the deliverables were circulated the day before the meeting, resulting in difficulties for some members who were en route to Toronto at the time of circulation. Group members were requested to send deliverables early enough to ensure adequate time to review and prepare comments (recognizing that this may be difficult due to the short timeframe of this process).

## Evidence of Link Between Parameters and Emissions

- Deliverable 7 - AIAMC presented “Fuel quality in Canada: Linkages between key parameters and tailpipe emissions”.
- AIAMC noted that the Pembina report “Fuel Quality in Canada - Impact on Tailpipe Emissions” was written to raise awareness on the importance of fuel quality, looks to potential auto industry needs of the future and looks beyond North America.
- A discussion ensued, but members requested time to review the presentation and give specific feedback.
  - ⇒ **Action Item** – All working group members to provide written comments/questions on AIAMC’s presentation
- Deliverable 8 – Environment Canada described a contract that Health Canada and Environment Canada are jointly sponsoring, to conduct a literature review of evidence to link the four parameters to emission reductions.
  - ⇒ A representative from the consulting company Environ EC (Canada), Inc. (Ted Pollock) introduced the project team, and answered a number of questions regarding their experience.
  - ⇒ EC noted that the results of this literature review won’t be available in time to feed into the recommendations on the four parameters. There was a concern raised that the working group may potentially be making recommendations without all relevant information. EC noted that AIAMC took on the deliverable to provide evidence linking the four parameters to vehicle emissions (i.e. the information that substantiates the conclusions made in the Pembina Report). This was presented at today’s meeting (and comments will be sent via email by working group participants). The working group will make recommendations using the available information at the time. When recommendations are sent to the Minister, EC will flag that a literature review is ongoing, and that the Minister will be advised if new pertinent information is identified as a result of the contract.
  - ⇒ There was a suggestion to be cautious when directing the literature review to encompass only documents produced post Tier II, because the current fleet of vehicles includes many pre-Tier II vehicles.
  - ⇒ **Action Item** – Environment Canada and Health Canada to speak to the consultant about including all relevant studies, not just post Tier-II
  - ⇒ **Action Item** – Environment Canada to circulate the statement of work for the literature review, and a draft bibliographic list of literature to be reviewed in about a week.
  - ⇒ **Action Item** – All working group members to suggest articles / other bodies of work that would be valuable to include in the literature review, if they are missing from the list.
  - ⇒ **Action Item** - EC and HC will share the consultant’s report with the working group members.

## Sulphur in Gasoline

- Environment Canada reviewed the updated gap analysis for sulphur.
  - ⇒ **Action Item** – Environment Canada to edit gap analyses based on comments given during the September 30th meeting.
  - ⇒ **Action Item** – All working group members to send written versions of any comments on gap analysis documents that they raised at the meeting (and any final comments they may have on these documents).
- Working group members agreed to the following summary of “what we know for sulphur”:
  - ⇒ Both Canada and the U.S. have a federal regulation for sulphur. Although the limits are the same, there is some timing variation because the U.S. is using a phased-in approach. This will end in 2010, at which time there will be no gap in sulphur federal regulations between Canada and the US.

- ⇒ Based on data reported to and purchased by Environment Canada, Canadian gasoline sulphur levels are of equal or better quality than the US.
- ⇒ There is a link between sulphur and vehicle emissions (related to catalysts) (*ref - The Regulatory Impact Analysis Statement for the Department of the Environment Sulphur in Gasoline Regulations (published in 1999), indicated that “A lower level of sulphur in gasoline will directly decrease vehicle emissions of sulphur-related air pollutants and will reduce other gaseous vehicle pollutants by enabling vehicle pollution control systems to function more efficiently”. The average sulphur content of Canadian gasoline at the time of this publication was 350 ppm.*)
- ⇒ There is a link between lower sulphur levels and the potential introduction of new vehicle technologies (such as lean-burn engines).
- ⇒ The EPA has indicated that “EPA is currently conducting tests to determine the magnitude of reductions in emissions that would result from sulphur levels in the 10ppm range. The results of this work, coupled with cost information and assessment of the enablement of new vehicle technologies, might potentially feed into a regulatory process to further reduce sulphur in gasoline.”
- Working group members identified the following potential elements of a recommendation on the path forward for sulphur:
  - ⇒ CPPI: recommend no action in the immediate future, but monitor development in the U.S., keeping in mind the principle of harmonization, and the need for lead time.
  - ⇒ AIAMC: would consider the above, but note that their principle concern in lean-burn technology enablement.
  - ⇒ CVMA: ok with CPPI’s recommendation to monitor the U.S., and if they are moving, we would want to align with U.S. levels for fuels (because the vehicle standards are the same).
  - ⇒ NRCan: CPPI’s recommendation makes sense, but need to confirm internally.
  - ⇒ EC: Co-operate with the U.S. EPA on studies to determine what the benefits may be to considering a further reduction of sulphur levels in gasoline.
- The following working group members volunteered to participate in a small group to draft a "straw dog" recommendation for sulphur (based on the elements of recommendations raised at the meeting):
  - ⇒ AIAMC – Andrew Morin
  - ⇒ CPPI – Gilles Morel
  - ⇒ CVMA – Yasmin Tarmohamed
  - ⇒ NRCan – Ruth Talbot
  - ⇒ Environment Canada
- **Action Item** – Environment Canada to contact these individuals to organize this work.
- **Action Item** – Small Groups to circulate the draft 'straw dog' recommendation by October 19th, for review and comment by working group members.
- **Action Item** – All working group members to review and provide comments on straw dog recommendation so that a revised version can be discussed at the October 30<sup>th</sup> meeting.

### Cetane Number in Diesel

- Environment Canada reviewed the updated gap analysis for cetane number.
  - ⇒ **Action Item** – Environment Canada to edit gap analyses based on comments given during the September 30th meeting.
  - ⇒ **Action Item** – All working group members to send written versions of any comments on gap analysis documents that they raised at the meeting (and any final comments they may have on these documents).
- Working group members agreed to the following summary of “what we know for cetane number”:
  - ⇒ There is a gap between Canada and US with regards to federal regulations for cetane



- US regulates to a cetane index of at least 40, Canada does not
  - The purpose of this rule was to regulate aromatic content
- ⇒ The purchased data shows that all branded diesel meets or exceeds the CGSB standard of a minimum cetane number of 40. And, refiners have indicated that all of their on-road diesel meets or exceeds the same CGSB standard.
- ⇒ The only data gap remaining was the non-refiner importers, but this represents less than 1% of diesel sold in Canada. At Meeting #3, the working group agreed that no additional data is needed to confirm the current state of Canadian fuel quality with respect to cetane.
- ⇒ Based on presented data, the cetane number quality of Canadian diesel is at least as good as or better than that of the US.
- ⇒ The EPA has indicated that “The current EPA regulation for diesel cetane does not have large impacts on criteria pollutant emissions. Enforcement is not a significant issue because pipeline quality standards and exchanges cause industry participants to protect themselves from potential variances.”
- Working group members identified the following potential elements of a recommendation on the path forward for cetane number:
  - ⇒ CPPI: recommend no action in the immediate future, and maintain the current system in Canada. In the context of harmonization with the US, monitor what the US EPA is doing with respect to cetane number, because it wouldn't be beneficial to consider a path forward for cetane index.
  - ⇒ AIAMC: Need to recognize that although there is no quality gap for cetane number in Canadian diesel, there is a regulatory gap between Canada and the US, and this is a concern.
  - ⇒ CVMA: Generally ok with CPPI's recommendation to monitor the US EPA, and in the context of harmonization, move in concert with the US EPA (but for cetane number, not index).
  - ⇒ Environment Canada: believes that this parameter is best managed by industry
- The following working group members volunteered to participate in a small group to draft a "straw dog" recommendation for cetane number (based on the elements of recommendations raised at the meeting):
  - ⇒ AIAMC – Gord Farrish (BMW)
  - ⇒ CPPI – Brian Ahearn (Imperial Oil)
  - ⇒ CVMA – Wyman Pattee (Ford)
  - ⇒ Environment Canada
- **Action Item** – Environment Canada to contact these individuals to organize this work.
- **Action Item** – Small Groups to circulate the draft 'straw dog' recommendation by October 19th, for review and comment by working group members.
- **Action Item** – All working group members to review and provide comments on straw dog recommendation so that a revised version can be discussed at the October 30<sup>th</sup> meeting.

## Lubricity in Diesel

- Environment Canada reviewed the updated gap analysis for lubricity.
  - ⇒ **Action Item** – Environment Canada to edit gap analyses based on comments given during the September 30th meeting.
  - ⇒ **Action Item** – All working group members to send written versions of any comments on gap analysis documents that they raised at the meeting (and any final comments they may have on these documents).
- Working group members agreed to the following summary of “what we know for lubricity”:
  - ⇒ Neither the US nor Canada regulate lubricity at the federal level. As such, there is no regulatory gap between Canada and the US with regards to lubricity

- ⇒ The purchased data shows that on average, the majority of branded diesel meets or exceeds the CGSB standard for lubricity. And, refiners have indicated that all of their diesel meets or exceeds the same CGSB standard.
- ⇒ The CGSB standard is more stringent than the ASTM standard
- ⇒ The only data gap remaining was the non-refiner importers of diesel, but this represents less than 1% of diesel sold in Canada. At Meeting #3, the working group agreed that no additional data is needed to confirm the current state of Canadian fuel quality with respect to lubricity.
- ⇒ Based on presented data, the lubricity quality of Canadian diesel is at least as good as or better than that of the US.
- ⇒ The EPA has indicated that they “rely on the ASTM standard for in-use control of lubricity”
- Working group members identified the following potential elements of a recommendation on the path forward for lubricity:
  - ⇒ CVMA: monitor EPA and see if they do anything. ASTM and CGSB are sufficient for now.
  - ⇒ CPPI: general agreement with CVMA, and emphasize that there is no need for regulation
  - ⇒ AIAMC: Rough convergence with CPPI and CVMA
  - ⇒ Environment Canada: We believe this parameter is best managed by industry standards such as CGSB (and ASTM in the US).
- The following working group members volunteered to participate in a small group to draft a "straw dog" recommendation for lubricity (based on the elements of recommendations raised at the meeting):
  - ⇒ AIAMC – Andrew Morin
  - ⇒ CPPI – Ken Mitchell (Shell)
  - ⇒ CVMA – Yasmin Tarmohamed & Glenn Bryksaw (General Motors)
  - ⇒ Environment Canada
- **Action Item** – Environment Canada to contact these individuals to organize this work.
- **Action Item** – Small Groups to circulate the draft 'straw dog' recommendation by October 19th, for review and comment by working group members.
- **Action Item** – All working group members to review and provide comments on straw dog recommendation so that a revised version can be discussed at the October 30<sup>th</sup> meeting.

## DCAs in Gasoline

- Environment Canada reviewed the updated gap analysis for DCAs and Jane Savage (CIPMA) presented the most recent results of data collection from CIPMA members regarding the levels of DCAs in gasoline sold by CIPMA members.
  - ⇒ **Action Item** – Environment Canada to edit gap analyses based on comments given during the September 30th meeting and to work with Jane Savage (CIPMA) to incorporate data presented at the September 30th meeting into the DCA gap analysis.
  - ⇒ **Action Item** – Jane Savage (CIPMA) to continue collecting DCA information from CIPMA members to fill the remaining data gap.
  - ⇒ **Action Item** – All working group members to send written versions of any comments on gap analysis documents that they raised at the meeting (and any final comments they may have on these documents).
- Working group members agreed to the following summary of “what we know for DCAs”:
  - ⇒ There is a federal regulatory gap between Canada and US with regards DCAs
    - US regulates the use of DCAs, Canada does not
  - ⇒ Based on presented data for unwashed gums, it appears that branded Canadian gasoline may, on average, be of better quality than U.S. fuel for DCAs.
  - ⇒ There is a small percentage of gasoline sold in Canada that doesn't contain DCAs.

- ⇒ There is a small percentage of gasoline sold in Canada for which the amount of DCAs is unknown.
- ⇒ The US EPA has indicated that “Compliance to the US EPA’s regulation for DCAs depends on provision of certification information, record keeping and reporting. The dynamic nature of fuel formulation, including the impacts of renewable fuels and the evolution of vehicle technologies make it difficult to maintain a program that ensures effective in-use deposit control.”
- Working group members identified the following potential elements of a recommendation on the path forward for DCAs:
  - ⇒ AIAMC: need something to equalize DCAs across Canada. Given the regulatory gap, a recommendation of “no action” might send signals that DCAs aren’t important. The treat rate of DCAs required to provide adequate performance should be revisited.
  - ⇒ CPPI: Due to competitiveness issues, CPPI has no stand on this issue
  - ⇒ CIPMA: Will need to digest the information
  - ⇒ CVMA: Ask the Minister to propose that the provinces regulate the CGSB standard for DCAs in gasoline. CVMA recognizes that there is a regulatory gap but that there are also recognized standards in place. They need time to have further discussion with association members. They also recommend that Environment Canada undertake further work to analyze if there would be benefits to additizing the volume of gasoline currently not additized to CGSB approved levels of DCAs
  - ⇒ Environment Canada: EC would not likely recommend that our Minister take regulatory action. However, there are likely other solutions that can be found to address the issue of some gasoline not containing DCAs
- The following working group members volunteered to participate in a small group to draft a "straw dog" recommendation for DCAs (based on the elements of recommendations raised at the meeting):
  - ⇒ AIAMC – Findlay Sams (Honda)
  - ⇒ CVMA – Yasmin Tarmohamed & Glenn Bryksaw (General Motors)
  - ⇒ Environment Canada.
- **Action Item** – Environment Canada to contact these individuals to organize this work.
- **Action Item** – Small Groups to circulate the draft 'straw dog' recommendation by October 19th, for review and comment by working group members.
- **Action Item** – All working group members to review and provide comments on straw dog recommendation so that a revised version can be discussed at the October 30<sup>th</sup> meeting.

## Other items

### Renewable Fuel Quality

- Environment Canada reiterated that along with developing a recommended path forward on the 4 fuel quality parameters, this technical working group is also the forum for industry to raise issues related to renewable fuel quality, which will also be provided to the Minister.
- CVMA confirmed that their key issue (as raised at Meeting 3) is “exceeding 10% ethanol in gasoline for non flex-fuel vehicles (FFVs)” and “exceeding 5% biodiesel” in the renewable fuel standard (RFS).
- CPPI confirmed that while they generally agree with the view point expressed by CVMA, they do not agree that the RFS is the appropriate means to deal with this, and expressed their desire for a separate process to be established to work on renewable fuel quality issues.
- EC noted that while reaching consensus is a preferable outcome, the report from the technical working group can include different issues / positions on renewable fuel quality from specific members or groups. That way, each industry group will have the opportunity to raise specific issues to the Minister.

- **Action Item** – CVMA and CPPI to draft positions on the issue of renewable fuel quality, to be tabled at the October 30th meeting. (Note CVMA will circulate their draft to AIAMC, CPPI and CIPMA to see if there is any consensus prior to meeting).

### **Dates & Venues for Subsequent Meetings**

- October 14<sup>th</sup> (No Meeting)
  - ⇒ **Agreement** among the working group that this meeting is not necessary (based on the progress of the September 30<sup>th</sup> meeting).
  - ⇒ Instead, the four small groups will work to draft straw dog recommendations on the path forward for each of the four parameters (based on elements identified at the September 30 meeting) and circulate to the working group by October 19<sup>th</sup>.
- New Meeting #5 – October 30<sup>th</sup> – Face to face meeting in National Capital Region
  - ⇒ Working group will endeavor to finalize recommendations at meeting.
  - ⇒ **Action Item** – Environment Canada to arrange meeting and circulate information to group

## Meeting 5 – October 30, 2009

### AGENDA – MEETING #5

October 30, 2009

9:30 am – 4:30 pm (ET)

Conference Call Dial-In Number:

1-877-413-4792

Conference Code: 4389083

Location:

Place Vincent Massey

Conference Room – St. Laurent

351 St. Joseph Blvd, 11<sup>th</sup> floor

Gatineau, QC

- 9:30 – 10:00**    **1) Introduction**
- i. Participant Introductions
  - ii. Opening Statement (Helen Ryan)
  - iii. Review of draft agenda
  - iv. Review minutes and action items from last meeting
- 10:00 – 10:30**    **2) Discuss outline of the TWG report**
- i. Present draft report outline
  - ii. Comments on draft report outline
- 10:30 – 11:15**    **3) Lubricity: Finalize Gap Analysis Document & Draft Recommendation**
- i. Discuss and Agree on final gap analysis document
  - ii. Use results of small group discussion (“straw dog”) as a starting point to draft (and attempt to finalize) recommendation on the path forward for lubricity
- 11:15 – 12:00**    **4) Cetane Number: Finalize Gap Analysis Document & Draft Recommendation**
- i. Discuss and Agree on final gap analysis document
  - ii. Use results of small group discussion (“straw dog”) as a starting point to draft (and attempt to finalize) recommendation on the path forward for cetane
- 12:00 – 12:45**    **Lunch**
- 12:45 – 1:45**    **5) Sulphur: Finalize Gap Analysis Document & Draft Recommendation**
- i. Discuss and Agree on final gap analysis document
  - ii. Use results of small group discussion (“straw dog”) as a starting point to draft (and attempt to finalize) recommendation on the path forward for sulphur
- 1:45 – 2:45**    **6) DCAs: Finalize Gap Analysis Document & Draft Recommendation**
- i. Discuss and Agree on final gap analysis document
  - ii. Use results of small group discussion (“straw dog”) as a starting point to draft (and attempt to finalize) recommendation on the path forward for DCAs
- 2:45 – 3:30**    **7) Renewable Fuel Quality: Identify Issues**
- i. Table renewable fuel quality issues to be raised to the Minister
- 3:30 – 4:15**    **8) Other Items**
- i. Update on EC and HC contract for a Literature Review
  - ii. Others?
- 4:15 – 4:30**    **9) Closing Discussion**
- i. Summary & Next Steps
  - ii. Meeting Debrief:

## **MINUTES – MEETING #5**

### **Attendees**

#### **In Person**

Larry Robertson	Chrysler
Wyman Pattee	Ford
Yasmin Tarmohamed	CVMA
Gordon Farrish	BMW
Findlay Sams	Honda Canada Inc.
Andrew Morin	AIAMC
Alana Lavoie	Canadian Trucking Alliance
Gilles Morel	CPPI
Brian Ahearn	Imperial Oil
Stephen Pathak	Imperial Oil
Jacques Bellavance	Shell Canada Products
Don Munroe	Suncor Energy
Ken Mitchell	Shell Canada Ltd.
Serge Lamy	Health Canada
Ruth Talbot	NRCan
Jean-Luc Matteau	NRCan
Indrani Hulan	Environment Canada
Lisa Ryan	Environment Canada
Ross White	Environment Canada
Larry Horn	Environment Canada
Warren Wilson	For EC

#### **Via Teleconference**

Lisa Ward	Husky Energy
Jacques Jobin	Ultramar
Ken Demchuk	CCRL
Jane Savage	CIPMA
Glenn Bryksaw	General Motors
Phil Petsinis	General Motors

### **Introduction, Review of Agenda, Key Concerns**

- Environment Canada explained the purpose of today’s meeting – to build on the work accomplished to date by the technical working group and hopefully to finalize recommendations on a path forward for each of the four parameters.
- Update on Small Groups to Draft ‘Straw Dog’ Recommendations: The ‘straw dog’ recommendations were circulated to the technical working group October 19<sup>th</sup>. Comments and suggestions will be tabled today with the goal of finalizing recommendations.
- Note to delete agenda item 8ii) *Potential {Presentation on In-Use Vehicle Testing Program (Environment Canada)}*, based on agreement from CPPI, CVMA and AIAMC.
- Helen Ryan, Executive Director of the Oil, Gas & Alternative Energy Division, Environment Canada came to the meeting to thank the working group for their hard work on this file. Helen informed the working group that she has been following the process closely, and has been updating the Minister’s Office. She commended the working group’s accomplishments to-date under such a tight timeline, and wished the group luck in finalizing recommendations today.
  - **Action Item** – Environment Canada committed to following up with the members of the Technical Working Group to communicate the Minister’s response to the working group’s report.

### **Outline of the Technical Working Group Report**

- Environment Canada presented a draft outline of the Technical Working Group Report and explained that the Background, Context and Process sections were compiled from existing information. The

remainder of the report is currently placeholders (and will eventually consist of information from the final gap analyses and recommendations agreed to by the technical working group).

- EC confirmed that the report will be submitted to the Minister as a report from the technical working group.
- The working group was asked to provide comments on the construct / format / wording of the report. Members were reminded that this meeting is their opportunity to make detailed comments. The review of the report following the meeting will be for major issues only – not wording suggestions.
- Working group members generally agreed with the format. A number of comments were made, including the following key suggestions:
  - ⇒ Context: Add text to reflect that the Minister’s request was in response to the publication of the Pembina report (previously “industry request”). Also reflect the fact that it was the Minister of the Environment who specified the context of harmonization with the US.
  - ⇒ Suggestion to add the Context to the Executive Summary of the report.
  - ⇒ Suggestion to add a Next Steps section to make clear that this report will be sent to the Minister for consideration.
- **Action Item** – Environment Canada to incorporate all comments from today’s meeting, populate the report with agreed upon text from today’s meeting, and circulate the report to working group members.
- **Action Item** – All working group members to review the Technical Working Group Report and communicate to Environment Canada within one week of circulation if they have any major concerns or if there is content they cannot live with.

## Lubricity in Diesel

- Environment Canada presented the updated gap analysis for lubricity in diesel. A few comments were made.
- Ken Mitchell presented the “straw dog” recommendation for lubricity, on behalf of the Small Group (which consisted of Glenn Bryksaw, Yasmin Tarmohamed, Andrew Morin, Ken Mitchell and EC).
- The working group was asked for comments / suggestions, and a discussion took place.
- Members were reminded that this meeting is their opportunity to make comments on the recommendation. The review following the meeting will be for major issues only – not wording suggestions.
- **Agreement** - Working group members agreed to the following final recommendation on a path forward for lubricity in diesel:
  - ⇒ *EC should monitor any new efforts in the U.S., but no additional action is recommended at this time because current lubricity levels are equivalent to, or better than, the U.S. Also, current lubricity levels are being managed by the current standard setting body (CGSB), and all meet the standard.*
- **Action Item** – Environment Canada to edit gap analyses based on comments received during the meeting and insert final gap analysis, summary of what we know and final recommendation on a path forward for lubricity in diesel into the Technical Working Group Report.

## Cetane Number in Diesel

- Environment Canada presented the updated gap analysis for cetane number. There were no comments.
- Brian Ahearn presented the “straw dog” recommendation for cetane number, on behalf of the Small Group (which consisted of Gord Farrish, Wyman Pattee, Yasmin Tarmohamed, Brian Ahearn and EC).
- The working group was asked for comments / suggestions, and a discussion took place.

- Members were reminded that this meeting is their opportunity to make comments on the recommendation. The review following the meeting will be for major issues only – not wording suggestions.
- **Agreement - Working group members** agreed to the following final recommendation on a path forward for cetane number in diesel:
  - ⇒ *At this time, it is recommended that no action is required on cetane number specification in Canada. EC should monitor what the U.S. EPA is doing with respect to cetane number. Should the U.S. EPA legislate a cetane number specification, Canada should assess environmental and human health benefits associated with harmonizing with U.S. requirements.*
- **Action Item – Environment Canada** to insert final gap analysis, summary of what we know and final recommendation on a path forward for cetane number in diesel into the Technical Working Group Report.

### Sulphur in Gasoline

- Environment Canada presented the updated gap analysis for sulphur in gasoline. A few comments were made.
- Andrew Morin presented the “straw dog” recommendation for sulphur, on behalf of the Small Group (which consisted of Yasmin Tarmohamed, Andrew Morin, Gilles Morel, Brian Ahearn, Ruth Talbot and EC).
- The working group was asked for comments / suggestions, and a discussion took place.
- Members were reminded that this meeting is their opportunity to make comments on the recommendation. The review following the meeting will be for major issues only – not wording suggestions.
- **Agreement** to make the following two insertions in the “Summary of What We Know For Sulphur”
  1. Add “There is a link between reduction of sulphur levels in gasoline and increased GHG emissions at refineries”.
  2. Move the footnoted statement from the Regulatory Impact Analysis Statement for the Department of the Environment Sulphur in Gasoline Regulations (1999) to the body of the summary.
- **Agreement - Working group members** agreed to the following final recommendation on a path forward for sulphur in gasoline:
  - ⇒ *Canada is currently harmonized with the U.S. on gasoline sulphur levels. In the context of continuing this harmonization, the federal governments of Canada and the US should work jointly to determine benefits and costs of further reduction of gasoline sulphur levels*
- **Action Item – Environment Canada** to edit gap analyses and summary of what we know based on comments received during the meeting and insert final gap analysis, summary of what we know and final recommendation on a path forward for sulphur in gasoline into the Technical Working Group Report.

### DCAs in Gasoline

- Environment Canada presented the updated gap analysis for DCAs in gasoline. A few comments were made.
- Findlay Sams presented the “straw dog” recommendation for DCAs, on behalf of the Small Group (which consisted of Yasmin Tarmohamed, Findlay Sams, Glenn Bryksaw, Phil Petsinis and EC).
- The working group was asked for comments / suggestions, and a discussion took place.
- Members were reminded that this meeting is their opportunity to make comments on the recommendation. The review following the meeting will be for major issues only – not wording suggestions.



- **Agreement - Working group members** agreed to move the following statements from the draft recommendation to other sections of the report:
  - ⇒ To the “Summary of What We Know for DCAs”: Although there is a regulatory gap between Canada and the US, over 96% of Canadian gasoline contains DCAs at levels that meet the U.S. regulatory requirement (CGSB levels), and over 40% of Canadian gasoline contains DCAs at higher levels. This has been achieved through a combination of regulations in some provinces, as well as specific initiatives led by select auto and oil companies.
  - ⇒ To “Other Considerations” (reworded): Efforts should also be undertaken to develop appropriate commercial standards for DCAs, including standards for new vehicle technologies.
- **Agreement - Working group members (excluding CPPI)** agreed to the following final recommendation on a path forward for DCAs in gasoline (Note: CPPI could not participate in the development of this recommendation on DCAs for competitiveness reasons):
  - ⇒ *Environment Canada and Health Canada should assess impacts associated with the identified quality and regulatory gaps, to determine if there are compelling reasons to consider possible government tools to harmonize DCA levels in Canadian gasoline with current U.S. levels. They should also monitor any new efforts in the U.S. on DCAs, and assess impacts associated with harmonizing with future levels.*
  - ⇒ *Other Possible Actions*
    - *There are industry-led options that could be considered, such as a voluntary agreement committing that all on-road gasoline purchased by end-users in Canada will have at least CGSB or EPA equivalent levels of DCAs, but do not restrict marketers from offering higher levels of DCAs.*
- **Action Item – Environment Canada** to edit gap analyses based on comments received during the meeting and insert final gap analysis, summary of what we know for DCAs in gasoline and final recommendation on a path forward for DCAs in gasoline into the Technical Working Group Report.

## Renewable Fuel Quality

- **CVMA** tabled information pertaining to their concerns with regards to renewable fuels and indicated that they are looking for feedback from the working group.
- CVMA polled working group members to see where there might be endorsement of the views tabled. Some members expressed support of CVMA’s position (but indicated they couldn’t commit without checking first with their members), others could not support it.
- A discussion took place during which it was confirmed that issues on renewable fuel quality will be treated differently than the 4 parameters in the working group report. It was clarified that the working group has been asked to make a recommendation on a path forward for the 4 parameters, whereas positions related to renewable fuel quality will be tabled by interested parties, and shared with the Minister.
- **Action Item – CVMA** to edit the format of their document to ensure that the renewable fuel quality issue is clearly identified as “a position tabled by CVMA (and any other association who decides to endorse it)” and not a “recommendation from the working group”. CVMA will then send the edited document to EC.
- **Action Item – Environment Canada** to add CVMA’s position to the Technical Working Group Report.
- **Action Item - Working group members** to review CVMA’s revised position (to be circulated as part of the Technical Working Group Report), and advise if they would like the report to reflect that they (or their associations, if applicable) endorse this position.

## Literature Review

- Environ gave an update on progress to-date for the literature review to look at the effect of the four parameters on vehicle emissions.
- **Action Item** – Environment Canada to circulate draft report to the working group for review (should be ready within one week). Date for comments will be set at the time of circulation.

## Closing Discussion

- Environment Canada reviewed the next steps for the technical working group:
  - ⇒ EC to compile all agreed upon text, based on discussions from the October 30<sup>th</sup> meeting.
  - ⇒ EC to circulate the Technical Working Group Report to all members of the working group. At that time, EC will advise if the report contains information on renewable fuel quality from CVMA, or if it will follow at a later time.
  - ⇒ All working group members will review the Technical Working Group Report and communicate to Environment Canada within one week of circulation if there is any content in the report that members feel can not live with. Members were reminded that this meeting is their opportunity to make comments on all the documents, and the review following the meeting will be for major issues only – not wording suggestions.
  - ⇒ In addition, any working group members who wish to have their name included as endorsing the position tabled by CVMA on renewable fuel quality will advise EC.
  - ⇒ The Technical Working Group Report will be submitted to the Minister of the Environment for consideration.
  - ⇒ Environment Canada will communicate with members of the technical working group once feedback is received from the Minister.
- Working group members offered thanks all around for participation and hard work. Some members reserved the right to comment on the process as a whole at a later time.

## **Annex 5: Additional Details on Deposit Control Additives**

### ***Description of CGSB-3.5 and CGSB-3.511 standards with respect to DCAs:***

Retailed gasoline shall contain a deposit control additive sufficient\* to meet either:

- an IVD requirement of less than 100 mg average deposit mass per valve after a 16 093.0 km (10 000 mile) driving cycle, or less than 25 mg average deposit mass per valve after a 8046.5 km (5000 mile) driving cycle as specified by ASTM D5500, OR
- an IVD requirement of less than 135 mg average deposit mass per valve after a 100 h dynamometer test cycle as specified by ASTM D6201.

\* To meet these requirements requires the addition of a deposit control additive, sometimes referred to as a detergent package. Proof of performance will be provided by

- certification by the deposit control additive supplier that the dosage recommended to the gasoline marketer/producer meets or exceeds the minimum as listed with the US EPA OR
- certification by the marketer/producer that the gasoline meets the IVD limits given in the ASTM D5500 or ASTM D6201 tests.

### ***Description of EPA requirements for DCAs:***

Coming into force August 1, 1997, the Regulation of Fuels and Fuel Additives: Certification Standards for Deposit Control Gasoline Additives in section 211 of the Clean Air Act stipulates that:

- All gasoline sold or transferred to the consumer must contain EPA certified DCAs to prevent the accumulation of deposits in engines or fuel supply systems.
- Certification requires that additive manufacturers must establish the minimum blending concentration (Lowest Additive Concentration – LAC) for each type of fuel for which the additive’s use is designated.
- There are a number of certification options for additive manufacturers:
  - nationwide certification
  - geographical options based on the Petroleum Administration Districts for Defense (PADDs)
  - fuel specific options for segregated gasoline pools (e.g. oxygenated, non-oxygenated, premium gasoline...)
  - California Equivalency (per CARB certification)
- Two types of deposits must be controlled under the regulation. The additive must meet ASTM D5598 for port fuel injector deposits (PFID) and ASTM D5500 for intake valve deposits (IVD). The testing results in an additive treat rate that can meet the required standards.

## ***Additional Detail on the Calculations for the DCA Quality Gap***

### Data Collected from the Oil Industry

*Canadian Refinery Production & Import:* All Canadian refiners reported information for the gasoline produced or imported by their refineries for sale in Canada. CPPI, CCRL & Irving Oil provided to Environment Canada the volumes of gasoline produced or imported by their refinery for sale in Canada that correspond to each of the following categories:

4. at least CGSB or higher levels of DCAs,
5. less than CGSB levels of DCAs and
6. unknown levels of DCAs (i.e. refineries sell gasoline without DCAs (as per supplier / purchaser agreement) and do not know if DCAs are added prior to retail sale)

*Gasoline Imported by Non-Refiner Marketers:* To complete the picture of gasoline imported for sale in Canada, information was required on the volume of gasoline imported by non-refiner marketers. Based on information submitted to EC for regulatory purposes and EC's follow-up with non-refiner marketers, EC was able to conclude that 100% of gasoline imported into Canada by non-refiner marketers in 2008<sup>14</sup> was subsequently additized to contain at least CGSB levels of DCAs at the point of retail sale.

Combining this information and a total volume of ~41 billion litres of gasoline produced or imported for sale in Canada in 2008 (as reported by Environment Canada based on regulatory submissions), the following values have been calculated:

	<b>DCA Levels</b>	<b>% by Volume</b>
<b>2008 Canadian Production &amp; Importation (for sale in Canada)</b>	At least CGSB or higher levels	95.9%
	Less than CGSB levels	0%
	Unknown levels	4.1%
	<b>Total</b>	<b>100%</b>

To determine the breakdown of the resulting 4.1% (~1.67 billion litres) of gasoline with unknown levels of DCAs, information was obtained from three groups, regarding the amount of gasoline domestically purchased by Canadian non-refiner marketers:

⇒ Association Québécoise des Indépendants du Pétrole (AQUIP): All gasoline imported or domestically purchased by their members contains DCAs that meet CGSB standards (as

<sup>14</sup> Based on demand and supply, importers vary from year to year – as such this data is representative of 2008 only. However, in general, independent associations have indicated the following:

- Canadian Independent Petroleum Marketers Association (CIPMA): Generally, more than 90% of gasoline imported by CIPMA members is imported into provinces where the CGSB standard is regulated.
- Association Québécoise des Indépendants du Pétrole (AQUIP): 100% of gasoline imported by AQUIP members is imported into a province where the CGSB standard is regulated.
- Note there is some membership overlap between CIPMA and AQUIP.

As such, for any given year, this value is between 90% and 100%.

CGSB is regulated in Quebec), even if some of that volume is sold in another province. No volume data was provided.

- ⇒ Canadian Independent Petroleum Marketers Association (CIPMA): CIPMA indicated that association members account for ~21.6% of gasoline sold at retail sites in Canada (including refiner branded retail sites managed by CIMPA members as well as retail sites owned outright by members). This 21.6% breaks down into: ~19% that contains at least CGSB levels of DCAs, ~1.6% that is unadditized and ~0.9% for which DCA levels are unknown.
- ⇒ Other Non-Refiner Marketers (non-CIPMA, non-AQUIP): EC has no data from this group of marketers.

From this information, the only data that further decreases our unknown is the 1.6% or ~0.67 billion litres of gasoline sold unadditized by CIPMA members in Canada. Although information from CIPMA indicated that the majority of gasoline sold by its members contains at least CGSB levels of DCAs, EC was not able to incorporate this data with the rest of the information, due to potential overlap with volumes reported by refiners. That is, a portion of the volume reported by CIPMA represents gasoline that is either sold at refiner-branded retail sites that are managed by CIPMA members, or that is sold by refiners to CIPMA members already additized

Therefore, the information allows us to summarize DCA levels in Canadian gasoline as follows:

	<b>DCA Levels</b>	<b>% by Volume</b>
<b>DCA Levels in Canadian Gasoline</b>	At least CGSB or higher levels	95.9%
	Not Additized	1.6 %
	Unknown levels	2.5 %
	<b>Total</b>	<b>100%</b>

To further assess the 2.5% or ~1 billion litres of Canadian gasoline for which DCA levels are unknown, it should be noted that a portion of this gasoline is sold in provinces where CGSB is mandated.

According to MJ Erwin’s *National Retail Petroleum Site Census – 2008*, there were 12,684 retail gasoline outlets in Canada in 2008 with the following breakdown:

- 7,699 refiner-branded retail sites.
- 4,985 non-refiner retail sites – this number includes:
  - ⇒ 2,382 CIPMA sites
  - ⇒ 1,835 non-refiner non-CIPMA retail sites in CGSB mandated provinces
  - ⇒ 768 non- refiner non-CIPMA retail sites in non-CGSB mandated provinces

Information from CIPMA indicates that of the 2.5% of gasoline sold in Canada for which it is unknown if DCAs are added, ~0.9% is from CIPMA retail sites in non-CGSB mandated provinces.

Of the remaining ~1.6%, there are 1,835 non-refiner retail sites in CGSB mandated provinces and 768 non-refiner retail sites in non-CGSB mandated provinces. Therefore, ~36% of that unknown volume is sold in non-CGSB mandated provinces.

Using that proportion, it can be estimated that the portion of the 2.5% “unknown” which does not contain DCAs is:

0.9%	sold by CIPMA in non-CGSB mandated provinces
+ 1.6% x 36%	sold by other non-refiner marketers in non-CGBS mandated provinces
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= ~1.5%	of Canadian gasoline.

Combining this data with information from CIPMA on the amount of unadditized gasoline sold by association members, there is a potential that ~3.1% or ~1.26 Billion litres of gasoline sold in Canada does not contain DCAs at levels that meet CGSB standards.

(However, taking into account that a portion of the gasoline is sold in Ontario contains ethanol and as such that gasoline would be subject to CAN/CGSB-3.511-2005: Oxygenated Unleaded Automotive Gasoline Containing Ethanol, it is likely less than 3.1%.)

As information is missing to complete the picture of all gasoline sold in Canada, we cannot confirm the size of the quality gap between Canadian gasoline and U.S. federally regulated levels for DCAs, and must rely on a range. Of the gasoline sold in Canada, 95.9% contains at least CGSB or higher levels of DCAs and we can estimate that ~3.1% does not contain DCAs and ~1% contains unknown levels of DCAs.

Therefore, the quality gap is between 3.1% and 4.1% of Canadian gasoline.

[www.ec.gc.ca](http://www.ec.gc.ca)

Additional information can be obtained at:

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