

**Stakeholder Meetings on Black Carbon from
Diesel Sources in the Russian Arctic
Murmansk and Moscow, Russia
January 28 to February 1, 2013**

Context of the Meetings

Battelle and its partners Murmansk State Technical University (MSTU) and WWF-Russia organized stakeholder meetings in Russia to discuss plans and options under a project sponsored by the U.S. Environmental Protection Agency (EPA) on Arctic Black Carbon: Reducing Emissions from Diesel Sources. The project consists of four tasks: scoping and planning, an inventory of relevant emissions in Murmansk, one or more demonstration projects, and analysis of policy and financing options to reduce emissions in the Arctic. Teresa Kuklinski from EPA and Meredydd Evans from Battelle participated in the meeting from the U.S. side; they were joined by U.S. Embassy colleagues in Moscow.

The meetings began in Murmansk, which is hosting the inventory task of the project. Murmansk is the largest city above the Arctic Circle. It is home to approximately 300,000 residents. It is a major seafaring town, and offers some of Russia's few year-round ice-free sea ports. We held a one-day group stakeholder meeting (the agenda and participants list are attached along with information on media coverage of the event). We also had a series of side meetings with the local government, partners, and environmental research organizations such as SRI Atmosphere.

The meetings then continued in Moscow to allow for greater stakeholder input. Federal government ministries, and many institutes and businesses have their headquarters in Moscow. We had individual meetings with Roshydromet (the environmental monitoring agency under the Russian Ministry of Natural Resources and Environment, MNRE), the Moscow City Government, the Motor Transport Institute (NIIAT), WWF-Russia, and several international organizations and banks. We also held a half-day stakeholder meeting to elicit feedback from a broader spectrum of experts. The agenda of this meeting is included in an appendix. In both cities, we shared copies of our draft work plan (available in both languages), and made presentations to elicit feedback on the details. We also invited several experts to share their own views and experience in presentations.

Important Conclusions and Feedback

We received excellent feedback on a range of issues. These included:

- The Russian government's view on black carbon (BC) and related issues of defining BC;
- Inventory methodologies and emission sources;
- Pilot project ideas and recommendations; and
- Information on related activities that a range of Russian and international institutions are undertaking, and progress on the ground to date.

Russian Government Feedback

The Russian government views BC as an important pollutant affecting human health. BC also has impacts on the climate system. There is an issue of definitions that may impact views in Russia. There is no direct translation in Russian for BC. The term most commonly used, “sazha”, means soot or total uncombusted fuel. This category in fact includes a wide range of substances that have varying impacts on radiative forcing. Two important conclusions grow from these conversations. First, we have clear common ground on the health impacts of BC, including the need to better understand sources of BC emissions and mitigation options. Second, to help improve understanding of the science associated with BC, Battelle is preparing a two-page document summarizing what we mean by BC, the associated health and climate science, and the options for mitigating diesel related emissions.

The Murmansk regional government expressed strong support for our project. They are also working to better understand particulate emissions in the city and region. Also, following our meetings, MNRE confirmed its approval of our project under the Arctic Council’s Arctic Contaminants Action Program (ACAP) and the Bilateral Presidential Commission’s Environment Working Group (EWG).

Inventory Methodology and Emission Sources

We had robust discussions around a range of inventory topics. Russian experts shared their sense of major emission sources in Murmansk. They asked us to include snowplows, which operate a large share of the year in Murmansk. Mining vehicles were also seen as a major potential source, particularly vehicles of older Belarusian makes like Belaz (which are common in the mines). Mines, like other enterprise, must prepare data on their vehicle emissions using a methodology developed by SRI Atmosphere; they pay nominal emission fines based on these corporate inventories. There is very little data on off-grid diesel generators, though the experts agreed that each generator can be quite dirty. The challenge with this source will be assessing the number of such generators—we are hopeful that the region may have some data because it is not tracking energy used by public sector entities. The more we are learning about these diesel generators, the more we understand that they do not all use diesel. Some use heavy fuel oil or a combination of fuels. We heard a range of opinions on whether to include the port and shipping. Some, including the regional government, felt it may be a major emissions source. However, MNRE has expressed concern about collecting this data, given the port’s economic importance and the sensitive military port nearby. We decided to collect only total diesel consumption data at the civilian ports (so that we can properly allocate total fuel use between sectors), but not to prepare an inventory of emissions. Finally, we heard varying views on the possible extent of light duty diesel vehicles as a source. According to statistics, light duty vehicles in Russia account for only 4% of diesel consumption. However, many Russian experts feel that fuel data often have errors. Some of the most popular SUV models in Murmansk are diesel (Volvo reports that close to a third of its light-duty vehicle sales in Murmansk are diesel, for example).

We also had good discussion and debate on how to best conduct the inventory. We heard very encouraging news that the methodologies NIIAT has developed for road emissions are based on detailed analysis of Russian emission factors, which will improve the accuracy of our results. (We will need to modify these methodologies to some extent to account for the colder climate and the fact that it is a smaller city). Some experts encouraged us to conduct direct measurement

of emissions or to develop our own unique emission factors and methodologies. We have decided to use international best practices, meaning that we will collect and develop detailed activity data and then apply Russian or international emission factors to estimate emissions (we will also have to apply speciation factors depending on the type of combustion to assess BC's share of particulate emissions, since most methodologies provide information on particulates). We also had discussion of the best way to measure vehicle population and activity. MSTU encouraged us to use traffic planning equipment and software to get an exact count of the vehicles at a given intersection over a long period. Instead, we are proposing to sample various sites with video and parking lot surveys as well as with questionnaires.

We also heard from several stakeholders about the importance of getting data officially and receiving official approval. We are hopeful that now that MNRE has approved of plans to add the project to ACAP and the EWG, along with the regional government's strong support, we will be able to address data access issues efficiently.

Pilot Project Ideas and Feedback

Many stakeholders, including the regional government, expressed an interest in concrete results. While the experts liked the idea of a larger, more impactful project, they also wanted to see clear results in the next two years. This is making us lean toward a smaller demonstration project where we have greater control of the timeline. We also had a productive discussion in both cities of the challenges of fuel supply—challenges that are not easily resolved in the context of a small project. (Equipment designed to operate with Euro 5 diesel, say, will be soon damaged with Euro 3 or Euro 0 fuel). Russia is rich in natural gas; switching from diesel (and other fuels) to natural gas is part of a long-term trend in Russia, and it aligns well with strategic government goals. For example, Gazprom is investing in a growing number of compressed natural gas facilities. Power and heat supply are also moving increasingly toward natural gas. However, there are no natural gas pipelines currently in Murmansk Region, and Gazprom recently delayed its plans for new gas supply from the massive Shtokman field in the Barents Sea. Fortunately, many Arctic communities in Russia are close to natural gas supply, so this is one option we are exploring. We also heard from Grasys, a supplier of gas separation equipment that is interested in setting up CNG and LPG networks in Russia, though it needs financing and partners. Another alternative is to use Euro 3 diesel; as of January 1, 2013, Euro 3 or cleaner diesel is required for transportation. However, these requirements do not extend to ships (and it is not clear if they apply to diesel generators and other off-road sources). Euro 5 is also available in Murmansk in limited quantities, and in Moscow, Euro 4 is required starting this year. The Russian government plans to roll out higher Euro fuel requirements nationwide in the coming years.

Regarding transportation projects addressing fleet vehicles, at the local level, we heard that the main bus company in Murmansk proper is private and highly constrained by low bus fares. Other intercity bus companies or operators of other fleet vehicles may be in a better position to consider a project. At the national level in Moscow, NIIAT also advised us that we need very strong and sustained local government support to successfully implement transport projects. We heard of just such an example of a policy in Moscow. WWF-Russia and other also expressed concerns about projects that would focus on filters instead of upgraded engines as people may simply remove the filters.

We heard suggestions on prioritizing the largest sources of emissions, though given our timeline, we will need to decide on pilot project before the final inventory is ready. Regarding specific projects, we heard of options to retrofit diesel generators in several Arctic regions (including Murmansk and Yakutia). We heard about interest in expanding natural gas networks in Naryan-Mar, Murmansk and other locations to supply gas for heat and power, as well as for transportation.

Related Activities and Progress on the Ground

The stakeholder meetings provided an excellent opportunity to learn about related activities and the potential for joining forces or learning from existing examples to achieve more impactful results. Some of the activities we learned about include:

- The roll-out of mandatory Euro 3 diesel standards in Russia in January 2013, and Euro 4 standards in Moscow at the same time.
- Availability of Euro 5 for luxury vehicles (it is available at three filling stations in Murmansk City, and additional ones in the region; it is also generally available in larger Russian cities). Statoil is the supplier in Murmansk. Elsewhere in Russia, Lukoil is the largest supplier of Euro 5 diesel, but many of the oil companies now produce it in limited quantities.
- Moscow City has many best practices that we can learn from, including their detailed inventory and monitoring of PM emissions, their introduction of CNG buses and shift toward natural gas in general, the ban of diesel trucks in the city during the day, and the higher Euro class fuel standards. Moscow has also hired NIIAT to prepare a new methodology on diesel emissions from higher Euro class vehicles. They are awaiting approval of the document before they share it.
- Murmansk Region has hired SRI Atmosphere to assess particulate emissions in Murmansk City. The results are due in March. Murmansk is also organizing an international conference on pollution with SRI Atmosphere in November 2013.
- Hydromet and MNRE are working with SRI Atmosphere on an assessment for air pollution, including particulates, across the Russian Arctic. This is linked to a new Russian strategy for development of the Arctic that includes on better monitoring of pollution.
- SRI Atmosphere has prepared a proposal for ACAP on developing better methodologies to assess BC emissions in Russia; MNRE supports this proposal, which shows growing Russian interest in the topic.
- SRI Atmosphere also expressed interest in organizing a study tour in the U.S. for senior Russian officials to learn more about BC.
- The UN Environment Programme and UN Development Programme have launched a collection of projects with support from the Global Environment Facility. One of these includes developing recommendations on governance and a national strategy to address Arctic pollution, including BC emissions.
- The European Bank for Reconstruction and Development is also working on several projects to reduce diesel and heavy fuel oil use. These include retrofitting heavy fuel oil power generators and boilers, improving the efficiency of diesel shipping in Vladivostok, and improving the efficiency of mining vehicles at an enterprise in the Russian Far East.

Appendix 1. Murmansk Agenda

09:00-09:30	Registration, Main building hall
09:30-09:35	Opening speech by Sergey Dubrovin, Vice-rector for Education
09:35-10:00	Overview on Black Carbon and Origin of the Project by Teresa Kuklinski, International Environmental Program Specialist, US EPA and Alexey Kokorin, WWF Russia
10:00-10:20	Project work plan by Meredydd Evans, Senior Staff Scientist, Joint Global Change Research Institute, Battelle, USA
10:20-10:40	Presentation “Arctic Black Carbon: Reduction of Black Carbon from Diesel Sources – Health Effects and Black Carbon” by Teresa Kuklinski
10:40-10:50	Presentation on black carbon inventories in the Russian context by Dr. Andrey Nedre, SRI Atmosphere.
10:50-11:00	Discussion over the project implementation milestones
11:00-11:20	Coffee-break
11:20- 11:40	Presentation “Technologies to Reduce Black Carbon Emissions from Diesel Combustion” by Vladimir Malyshev, PhD (Technical Sciences), Professor, Head of Energy and Transport Department, MSTU
11:40-12:10	Discussion over data sources: fuel use, vehicle fleets, off-road vehicles, diesel generators. Expertise gained from previous vehicle surveys in Murmansk
12:10-12:25	Presentation on the proposed inventory methodology by Meredydd Evans
12:25-12:40	Presentation “Comparative Analysis of Russian Methodologies of Road Transport Emissions Inventory” by Svetlana Tretiakova, Assistant Professor, Department of Ecology and Environmental Protection
	Discussion of the project methodologies
13:00-14:30	Lunch at “Park Inn Polyarniye Zori Hotel” (17, Knipovicha Str.)
14:30-15:00	Excursion to Regional Research and Production Centre, MSTU
15:00-15:20	Brief Overview on Suggested Criteria and Priorities for Pilot Projects by Meredydd Evans
15:20-15:40	Presentation “Transport Networks Modeling as a Way to Optimize Road Traffic” by E. Gusev, Junior Staff Scientist, lecturer at Energy and Transport Department, MSTU
15:40-16:50	Round-table discussion about projects options in Russia and coffee
16:50-17:00	Closing of the meeting

Appendix 2. Murmansk Media Coverage

MSTU holds a seminar on environment protection of the Arctic (В МГТУ проходит семинар по вопросам защиты окружающей среды Арктики), January 29, 2013

http://www.mstu.edu.ru/news/29-01-2013/Arctic_issies_workshop.shtml

Murmansk State Technical University will study soot emissions in Murmansk Region (Мурманский государственный технический университет займётся исследованиями выбросов сажи в Мурманской области), January 29, 2013

<http://nord-news.ru/news/2013/01/29/?newsid=43284>

<http://news.mail.ru/inregions/nordwest/51/society/11780042/>

Environmental seminar in MSTU (Экологический семинар в МГТУ), January 29, 2013

<http://murmansk.bezformata.ru/listnews/ekologicheskij-seminar-v-mgtu/9193960/>

MSTU will study soot emissions in Murmansk Region (МГТУ займётся исследованиями выбросов сажи в Мурманской области), January 30, 2013

<http://www.hibiny.com/news/archive/39664>

Appendix 3. Moscow Agenda

February 1, 2013

Arctic Black Carbon: Reduction of Black Carbon from Diesel Sources

Moscow, WWF Russia

(Moscow, Nikoloyamskaya st. 19, building 3)

10:00-10:30 Introduction

- Welcome from WWF and Introductions
- Overview on black carbon and origin of the project (Teresa Kuklinski, U.S. EPA and Alexey Kokorin, WWF)

10:30-11:15 Diesel Black Carbon in the Russian Arctic: Work Plan Overview

- Black carbon inventories and methodologies (Meredydd Evans, Battelle)
- Discussion on pilot project options and criteria (Meredydd Evans, Battelle)

11:15-12:15 Mitigation Technologies and Options

- Options, criteria and suggested priorities for pilot projects (Alexey Kokorin, WWF)
- Analysis of the influence of the main fossil fuels on the environment (Nadezhda Vlasenko, Grigory Yulkin, Gazprom VNIIGAZ)
- Experience of Moscow City to monitor and reduce emissions of particulate matter (Olga Kislova)
- Discussion

12:15-1:00 Overall comments and feedback on black carbon and diesel in Russia

- Olga Popovicheva, Institute of Nuclear Physics, Moscow State University
- Other participants