

A photograph of an Arctic landscape featuring jagged ice formations and dark rocks under a clear blue sky. The text is overlaid on this image.

# **U.S. EPA Initiative to Reduce Black Carbon from Diesel Sources in the Russian Arctic**

## **Diesel Black Carbon Workshops and Site Visits in Russia**

**Moscow  
October 6-7, 2011**

**Salekhard  
October 9-10, 2011**

**Murmansk  
October 12, 2011**

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## Table of Contents

Meeting Summary.....	1
Purpose of the Workshops & Site Visits .....	1
History of U.S. EPA's Diesel Black Carbon Initiative in the Russian Arctic .....	1
October 6, 2011 Workshop, Moscow, Russia .....	2
October 7, 2011 Workshop, Moscow, Russia .....	5
October 8-11, 2011 Site Visits to Salekhard, Russia .....	6
October 12, 2011 Site Visit to Murmansk, Russia.....	7
Conclusions .....	8
Meeting Agendas .....	10
October 6, 2011 – Workshop Agenda.....	11
October 7, 2011 – Workshop Agenda.....	13
October 9-10, 2011 – Meeting Agenda.....	15
October 12, 2011 – Regional Seminar Agenda .....	16
Participant Lists .....	17
October 6, 2011 – Workshop Participant List.....	17
October 7, 2011 – Workshop Participant List.....	20
October 8-11 – Meeting Participant List.....	22
October 12, 2011 – Regional Seminar Participant List .....	23
MNRE Press Release .....	24



## Meeting Summary

### Purpose of the Workshops & Site Visits

The workshops, *Workshops on Diesel Emissions, Pollution Mitigation, and Clean and Alternative Technologies in the Arctic*, helped kick-off the U.S. Environmental Protection Agency's (U.S. EPA) Diesel Black Carbon Initiative, designed to reduce black carbon (BC) from diesel sources in the Russian Arctic. The workshops were held October 6 & 7, 2011 in Moscow, Russian Federation and the site visits October 9-10 in Salekhard, and October 12 in Murmansk.

The objectives of the October 6 & 7 workshops in Moscow were:

- To provide information about black carbon assessments of the Arctic
- To discuss the link between diesel emissions and black carbon
- To gather experts from Arctic countries to share information and technologies on reducing diesel emissions, black carbon and improving the efficiency of energy systems in remote areas of the Arctic
- To identify potential demonstration projects and next steps

The workshops were intended to contribute to the pan-Arctic work of the Arctic Contaminants Action Program (ACAP) Project Steering Group on black carbon as well as to inform the development of black carbon mitigation projects under the U.S.-Russia Bilateral Presidential Commission Environment Working Group. Two concurrent site visits to Salekhard and Murmansk followed the Moscow workshops. The purpose of the site visits was to meet with regional governments and other stakeholders to exchange information about diesel black carbon and to learn more about diesel black carbon issues in the Russian Arctic.

A summary of the workshops and site visits follow. The agendas and participant lists for the workshops and site visit regional government led meetings are attached. Additional information about the workshops and site visits can be found on the website, [www.russianarcticbc.org](http://www.russianarcticbc.org), which has all of the presentations.

### History of U.S. EPA's Diesel Black Carbon Initiative in the Russian Arctic

Within the framework of the Copenhagen Summit in December 2009, Nancy Sutley, Chair of the White House Council on Environmental Quality, announced the Obama Administration's intention to commit \$5 million towards international cooperation to quantify emissions and impacts of black carbon from fossil fuel and biomass burning, and to reduce black carbon emissions and the associated warming effects in and around the Arctic.

The U.S. Department of State has prioritized reducing black carbon in the Russian Arctic, and has sought U.S. EPA's expertise in reducing diesel emissions to address this challenge.

The U.S. Department of Energy is also responding by developing collaborative programs on combined heat and power to attempt to address the residential sources of black carbon. The U.S. Forest Service is working on reducing black carbon from forest fires and agricultural burning in the Russian Arctic.

**Diesel Black Carbon in the Arctic:** In the Arctic, mobile and stationary diesel engines are among the largest sources of black carbon emissions. Mobile diesel sources include both on-road equipment, such as highway trucks and buses, and non-road equipment, such as construction and farming equipment, locomotives and marine vessels. Across the diesel sector, substantial black carbon reductions are possible. In addition, many Arctic nations (excluding Russia) have new engine standards in place that are projected to significantly reduce particulate matter (PM) (and black carbon) emissions over the next 30 years. For example, in the United States, changes in fuel composition and advances in engine design have reduced black carbon emissions from new heavy-duty diesel engines by 99% compared to uncontrolled engines. These efforts will also lead to improved urban air quality and corresponding improvements to public health.

Under the Black Carbon Diesel Initiative, U.S. EPA is engaging with partners from government agencies; U.S. Arctic and Russian NGOs; Russian and Arctic stakeholders; indigenous communities and observer groups to assess diesel sources of black carbon in the Arctic and develop demonstration projects, policy recommendations and financing options.

Over the next several years, EPA will work on a four-step project to reduce black carbon emissions in the Russian Arctic. Specifically, U.S. EPA will work to:

- Assess primary sources of black carbon in the Russian Arctic;
- Develop a targeted baseline emission inventory for black carbon from diesel sources, in key areas;
- Implement targeted, on-the-ground demonstration projects for reducing black carbon from diesel; and
- Establish policy recommendations and financing options for reducing black carbon diesel sources.

While EPA's work will be focused in the Russian Arctic, the project will collaborate more broadly to reduce diesel black carbon emissions across the Arctic.

Results of this project will be reported to the Arctic Council through the Arctic Contaminants Action Program (ACAP), and to the U.S.-Russia Bilateral Presidential Commission through the Environment Working Group (EWG).

To coordinate the project, ACAP has set up a Black Carbon and Short-Lived Climate Forcers (BC/SLCF) Project Steering Group, which is being led by U.S. EPA and co-chaired by Norway, Sweden and Russia. This steering group is comprised of the key Arctic stakeholders who will help implement the project on the ground.

### **October 6, 2011 Workshop, Moscow**

**Summary and Discussion:** The October 6 workshop brought together about 65 participants from countries of the Arctic region (Canada, Finland, Norway, Russian Federation, Sweden, and



USA), representing national environmental agencies and other relevant governmental bodies, international organizations, national environmental and public health research institutions and universities, indigenous communities of the Arctic, and non-governmental organizations.

The October 6 workshop was held at the European Union delegation facility in Moscow. The session covered a number of issues, including the scientific and practical assessment of black carbon emissions and related effects on environment and public health, particularly with regard to indigenous communities of the Russian Arctic region.

The discussion throughout the workshop revealed a high level of scientific expertise with regard to assessment of chemical composition/specifics of certain emission sources and the health effects of black carbon emissions in Russia. In particular, research institutions under the Russian Academy of Sciences, as well as under the Russian Academy of Medicine Sciences, were extensively represented and provided valuable contributions.

The workshop provided opportunities for international and national networking and building the national profile of black carbon research work in Russia. As there is extensive expertise already in Russia, the meeting enhanced the internal coordination and information exchange on black carbon-related research efforts and related outcomes. In addition, the meeting brought together 6 of the 8 Arctic Council countries to discuss black carbon mitigation initiatives across the Arctic.

#### *Points raised by the participants:*

- Issues concerning the assessment of health effects of black carbon (soot, particulate matter) in Russia include the implementation of particulate matter (PM) 2.5 emissions assessment/monitoring, and the practicality and feasibility of including black carbon as a part of this assessment.
- Very little air monitoring exists in Russia. Moscow, St. Petersburg, and a few other places have the only existing monitoring stations.
- The costs of retrofitting diesel engines and the practical aspects of introducing black carbon controls.
- **Sweden:** The Swedish Government is interested in developing bilateral cooperation on black carbon and PM emission inventory work with Russia.
- **Norway:** Diesel generators are only a very small part of energy generation in the remote regions of Norway and are only used for back-up electrical generation. Most generators use coal. In Svalbard, the main energy source is coal, with diesel as back-up. Norway proposed a new ACAP project, to look at black carbon from residential heating sources, with a focus on wood burning and an analysis of different emission factors and emissions from different stoves. Norway is interested in developing harmonized emission factors for wood burning stoves and exploring new technologies for woodstoves and boilers.
- **Finland:** Finland has replaced diesel with biodiesel to reduce particulate matter and black carbon emissions from buses. Currently Finland has 10 ppm sulfur in diesel fuel (Euro 6 in place) engines. Finland put in place the world's largest field test with renewable paraffinic diesel (HVO), with 300 buses. Older vehicles were retrofitted with diesel particulate filters (DPFs). The Finnish maintain that biodiesel can replace regular diesel 100% of the time without any operational problems and provide significant benefits.

- **Canada:** Canada primarily discussed transportation, diesel and black carbon emissions. Canada is researching black carbon and gas flaring (Carlton University), and air emissions from commercial ships operating along the northern coast of Canada.
- **Nordic Environmental Finance Corporation (NEFCO):** NEFCO is developing public-private projects, with a focus on Russia, Belarus, and Ukraine. NEFCO has an energy-saving component, which involves fairly small projects, around 10 “black carbon” projects totaling about 12 million euros. These include providing alternative energy for diesel stations, biomass fuel switching program in Arkhangelsk (funded by Norway and Russia) and investments in boiler in Arkhangelsk oblast. 54 projects have been identified, 20 of which are modular projects.

***Pilot project ideas generated prior to and during the meeting included:***

- Black carbon emissions inventory development, including technical methods, measurements, emission factors, and approaches;
- Development of a black carbon emission register, including sources and emission levels in a pilot region in the Russian Federation;
- Assessment of health effects of black carbon emissions (e.g. in Arkhangelsk);
- Assessment of effects of black carbon emissions on indigenous communities of the Russian Arctic— separate health-related project;
- Environmental education and outreach, which could include a training course, awareness-raising activities, including educational materials and a brochure, information on a website. This would be targeted at civil society and governmental agencies;
- Assessment of black carbon emissions from diesel generators, the impacts on environment and health, and ways to reduce these emissions;
- Assessment of black carbon emissions from oil and gas flaring;
- Cooperative (parallel) projects on assessment of black carbon emissions, technologies, and health effects on indigenous communities in the Russian Arctic and Alaska;
- Identification and characterization of black carbon emission sources and specific qualities of black carbon particles.

***Summary of Project Ideas from the October 6 workshop:***

- Develop inventory of Black Carbon emissions, including work on methods, measurements, and emission factors. Sweden is working with Russia on black carbon emission inventories, and these projects could intersect. This would include an inventory of black carbon emissions in the northern area, collaborating across the Arctic.
- Summarize methods to reduce black carbon emissions, including technologies, costs, and emission reduction estimates. Provide testing information on options to reduce emissions from diesel.
- Assess the impact of black carbon in small towns in the Russian north, including a risk assessment of diesel emissions.
- Clarify maximum emissions concentrations that are safe for humans under cold climates: are there standards that might be different in the north?



- Prepare a brochure in English and Russian on black carbon and diesel emissions, including the health effects.
- Develop a training course, which could be used for government authorities at all levels, but also for non-governmental organizations and industry.

Ideas and suggestions generated at the workshop served as a basis for the follow-up discussion on October 7, 2011.

### **October 7, 2011 Workshop, Moscow, Russia**

**Summary and Discussion:** The October 7 workshop, also called the “Joint Workshop/Steering Committee of ACAP Short-Lived Climate Forcers/Black Carbon,” was hosted by the Ministry of Natural Resources and Environment of the Russian Federation (MNRE) at the Ministry’s offices in Moscow. Russian presenters discussed (1) Short-Lived Climate Forcers in the Gothenburg Process; (2) Russian research on black carbon in the Arctic; and (3) black carbon emissions management in the Russian Federation, current status and room for improvement. U.S. EPA and other international experts delivered condensed (or substantially reworked) versions of their presentations from the October 6 meeting.

Sweden proposed a practical way to go forward with black carbon work in Russia, taking advantage of ongoing bilateral Russian-Swedish cooperation agreement for 2012-2014, which already includes development of a PM and BC emissions inventory, with budget to be provided by the Swedish Government.

The chair summarized the meeting by saying that it is the wish of the Russian side to have proposals ready for approval by ACAP, with the focus on practical formulations, including projects with indigenous communities. These should balance practical results with priority tasks, such as protection of air quality. He asked all to send forward proposals for future funding under the Project Support Instrument (PSI), managed by NEFCO. These will be collected and sent for review. The Russian government had very recently announced they would be contributing 10 million Euros to the PSI, which would make the PSI operational.

#### ***Revised ideas on potential pilot projects from Russian experts (including suggestions expressed by MNRE):***

- Develop black carbon emissions inventory and assessment: translate assessment methods into Russian; explore opportunities to harmonize methodologies with the other efforts taking place in the Arctic (AMAP and the Arctic Task Force on Short-Lived Climate Forcers); develop a black carbon emission register (including sources and emission levels) in a pilot region in the Russian Federation.
- Conduct a multi-level “pilot project” for indigenous settlements in the north that would provide information and data, an inventory of diesel sources of black carbon and an action plan for reducing emissions -- with the goal of reducing black carbon emissions and mitigating health impacts. The project would also provide a common platform for proposals and analytical data for decision makers, along with investments.
- Develop information materials that would provide an overview of black carbon abatement technologies and approaches, along with emissions reductions estimates and cost estimates.

- Revise Russian “green standards” for residential buildings/construction in the Russian Arctic, with the focus on reduction of black carbon emissions and minimizing health-related risks of black carbon emissions;
- Share experiences between Alaska and Northern Russia on common pilot projects.
- Disseminate information, raise awareness and provide training and education on black carbon emissions and methods to reduce emissions, with a focus on indigenous communities of the Russian Arctic and the Far East.

A Russian Ministry press release about the workshop is attached.

### **Site Visit to Salekhard, Russia, October 8-11, 2011**

“Joint Meeting of the Working Group of the Public Chamber of the Russian Federation on the Development of Remote Territories of the North and the Far East and the Working Group of the Arctic Council ACAP ”

**Summary and Discussion:** The meeting at the government palace of Yamalo-Nenets Autonomous Okrug was organized by RAIPON and the Yamal-Nenets Autonomous District.

The Chairman of the Legislation Assembly of Yamalo-Nenets Legislative Assembly/President of RAIPON (Chairman), welcomed all and thanked the delegation for bringing the first snow to Salekhard. The Chairman discussed the fact that the Arctic is a unique ecosystem and a strategic site of economic power for the country. He stated that energy efficiency and energy protection are a main priority of Russia’s Northern Areas, and that there is strong interest in alternative energy sources, including wind. He also reiterated that any project in Yamal must ensure cooperation with indigenous peoples, but that the results of projects in Salekhard would be shared across Northern Russia.

The participants exchanged information about the health and climate effects of black carbon, as well as the opportunities to reduce diesel black carbon emissions from mobile and stationary engines and utilize alternative technologies to reduce black carbon, including replacing diesel engines. Participants also exchanged information about the energy and environmental/air policies and plans in Salekhard and the surrounding region, and information about EPA’s Diesel Black Carbon Initiative. Reducing diesel black carbon is a priority for the region as is reducing the costs associated with transporting diesel to remote sites. The region is planning to extend the existing natural gas pipelines and hopes to expand the use of alternative energy technologies, mainly wind energy. The Russian government is promoting wind power, although wind is not currently being used to generate electricity in the Yamal region, which has a great deal of wind. Yamal is interested in developing a decentralized wind generation project. The region is hoping to reduce its use of diesel from 22% of the current electricity generation to 10%, and move to natural gas and wind. 77% of the total electrical generation in Yamal region is from natural gas. The region is also interested in expanding its electrical grid to share power among villages.

Participants supported continuing discussions about potential pilot projects to reduce diesel black carbon in the region, while acknowledging that criteria is under development to determine the pilot regions and projects that will be selected. The Yamal participants were not engaged on mitigation of transportation sources or on the issue of low-sulfur diesel fuel requirements for cleaner engines.

### ***Conclusions of the Session:***

- The regional government of the Yamalo-Nenets region is very interested in working with EPA on a pilot project in a remote area, and will find a pilot if EPA or NEFCO will provide the investment.
- The Yamal Region is particularly interested in ideas and proposals on wind energy and have said that many foreign countries are interested in investment in wind in Salekhard, including German and Danish companies.
- NEFCO is open to cooperation and ready to meet representatives of municipal governments. Although the sites that the team visited were working well, there are most likely still areas where the region would still need help, and these are the areas where NEFCO would concentrate.
- EPA is in the process of developing criteria to choose the pilot regions and projects.
- All sides shared points of contacts for further discussion and continued cooperation in the future to decrease emissions of black carbon.

The delegation also visited two power generation facilities in the Yamal region. The first plant employed diesel generators in the village of Harsaim. The total capacity of this plant was 1200kW from seven engines and it services about 100 households or 1000 people. Six of the generators used old uncontrolled engines and a newer one was manufactured by a Turkish company called Teksan. The emissions characteristics of the newer generator's engine are unknown at this time. However, the operators reported improved efficiency. Future upgrades are planned. The second village visited, Aksarka, employed a recently built (~2008-9) natural gas power plant. This plant consisted of three 1540 kW Cummins natural gas engines, which are able to be used because of a large natural gas pipeline to the village. Prior to 2004, Aksarka relied on diesel generators for its power. In 2004, the diesel generators were replaced with engines that ran on a diesel and natural gas fuel mixture. However, these engines faced operational problems that led to them being decommissioned. They are now only used as stand-by generators. The Yamal energy officials are considering transmitting the excess electricity from the Aksarka plant to nearby villages. They also have plans to use the excess heat from the power plant for home heating and integrating it with the existing home heating network.

### **Site Visit to Murmansk, Russia, October 12, 2011**

“Regional Seminar: Effects of black carbon (soot) emissions from mobile and stationary sources in the Arctic and abatement strategies including transition to cleaner technologies”

***Summary and Discussion:*** The regional seminar was organized by SRI Atmosphere and the regional government of Murmansk. Participants included representatives from local and regional governmental agencies, non-governmental organizations, academic institutions, and private companies. Murmansk regional meeting participants were very interested in both stationary and mobile sources of black carbon. Most of the stationary sources (power plants) in Murmansk burn heavy oil and coal. Officials of both the Committee of Industrial Development, Environment and Nature Management of the Murmansk Oblast and the head of the Federal Supervisory Natural Resources Management Service, Murmansk branch expressed interest in a pilot project. The Murmansk government officials presented information on a range of environmentally related activities in the region and pointed out existing inconsistencies with regard to reporting of soot emissions across regional districts. The Murmansk officials suggested the development of a pilot

project to assess the current situation and streamline soot (including black carbon) emissions reporting in the region as a whole.

***Points raised by the participants:***

- Priorities at the regional level are black carbon emissions from transport and sea vessels and related health effects;
- Issues related to the cost of installing particulate filters on buses and the availability and costs of monitoring equipment for black carbon emissions from mobile sources (trucks and buses) were cited;
- Interest in wind-diesel generators, especially related to experiences in operation and costs (cost of the energy generated) was expressed;
- The regional officials were interested in assessing the regional development and investment program of Murmansk as a transport hub (coal, hydrocarbons and general cargo shipping), with a focus on the potential increase in black carbon emissions.
- Interest was expressed in the types and costs of air monitoring devices as well as U.S. EPA's methodology for estimating emissions inventories.
- ROSHYDROMET has 9 monitoring centers at industrial areas (total of 18 stations) that measure 3-4 samples per day of HC, SO<sub>4</sub>, and NO<sub>x</sub>.
- The Deputy Chairman of Industrial Development, Environment and Nature Management of the Murmansk Oblast also presented data showing mobile source emissions and some estimates of black carbon emissions and trends from stationary sources (design values, not measurements).

***Conclusions of the Session:***

The Murmansk government officials reiterated their interest in cooperation on black carbon issues, especially with regard to diesel public transport sector, sea cargo port and its diesel vessels. Also, it was suggested to consider conducting an assessment of the Murmansk regional investment program on development of a regional transport (mainly sea transport/shipping) hub, which would affect the City of Murmansk, as well as the whole Kola Peninsula region. Overall, the regional government offered full support for potential pilot projects to abate black carbon emissions from priority sources listed above.

The delegation also visited a diesel boiler facility in Drovyanoye settlement in Murmansk. It was a central heating plant with 3 diesel fired boilers. There was a recent upgrade to new equipment with diesel as the second fuel source. The current fuel used has a very high sulfur level (estimated 1000-2000 ppm).

**Conclusions**

From this set of workshops and site visits in Russia, the following were identified:

- ✓ MNRE is interested in black carbon from a health and air pollution perspective, and are particularly interested in pilot projects in indigenous villages with stationary diesel generators.
- ✓ On the regional level, in both Salekhard and Murmansk, there is clear support for black carbon-related initiatives. The Yamal-Nenets regional government is interested in wind-

diesel generators and replacement of older diesel generators with new technologies. In Murmansk, the local and regional governments were very interested in collaborating with EPA on diesel public transport and shipping. A separate issue of black carbon emissions from heavy oil power plants is also of high interest for the Murmansk city and regional governments.

- ✓ There exists extensive national expert and scientific capacity in Russia, with a variety of research conducted on different aspects of black carbon emissions. However, this research needs to be better coordinated across Russia and there needs to be better information exchange. Streamlining and supporting such information and knowledge exchange will be a practical and cost efficient way of stimulating national capacity building.
- ✓ Other nations, including Canada and some Scandinavian countries, have expressed interest in providing support to this effort. Sweden and Russia are collaborating on a black carbon emissions inventory and would be interested in conducting the initial emission inventory in the area that is chosen for the pilot project.
- ✓ The U.S. EPA is in the process of developing its black carbon pilot projects in Russia, and will use the information gathered in the workshop and site visits to determine the details of the pilot projects.

**Figure 1. Welcoming Ceremony: Site Visit to the Arctic Circle**



## Meeting Agendas





## October 6, 2011 – Workshop Agenda

Conference Hall of European Union Delegation to Russian Federation

### Purpose of the Workshop:

- To provide information about black carbon assessments of the Arctic
- To discuss the link between diesel emissions and black carbon
- To gather experts from Arctic countries to share information and technologies on reducing diesel emissions, black carbon and improving the efficiency of energy systems in remote areas of the Arctic
- To identify potential demonstration projects and next steps

### 9:00 Welcome, Introductions, and Opening Remarks

European Union Delegation to Russia

SRI Atmosphere – *Andrey Nedre, Director General of SRI Atmosphere*

U.S. EPA

### 9:30 Black Carbon: Status of Scientific Assessments and Health Effects

Arctic Council: Task Force on Short-Lived Climate Forcers & Arctic Monitoring and Assessment Program Black Carbon Expert Group – *Ben DeAngelo, U.S. EPA*

U.S. EPA Black Carbon Report to Congress & Black Carbon under LRTAP: The Linkage to Air Quality and Public Health – *Erika Sasser, U.S. EPA*

General Health Effects of Particulate Matter incl. BC Emissions – *Prof. Migmar Pinigin, A.N. Sytin Scientific Research Institute for Human Ecology and Environmental Hygiene*

### 10:30 Break

### 10:45 Stationary and Mobile Diesel Sources of Black Carbon in the Arctic

Stationary Diesel and Alternative Technologies:

– *Dr. Vladimir Shevchenko, Shirshov Institute of Oceanology of Russian Academy of Sciences, "Black carbon research in the Russian Arctic"*

– *David Light and Frank L. Williams, University of Alaska Fairbanks Center for Energy and Power*

Mobile Diesel:

– *Mike Walsh, International Consultant*

– *Mike Geller, U.S. EPA*

### 12:30 Problems of Diesel Usage at Indigenous Remote Communities

Health Effects of Emissions – *Valery Chashchin, Doctor of Medicine, Professor, Director of Northwestern Scientific Centre for Hygiene and Public Health in St. Petersburg, "Health effects associated with the exposure to diesel exhaust in a cold environment"*

Economic Benefits to Reduce the Usage of Diesels at Arctic Indigenous Communities – *Sergey Sizonenko, Head of the Committee on Indigenous Issues of the Taimyr Municipality of Krasnoyarsk Krai*

**1:00** Lunch

**2:00 Experiences from Arctic Countries in Addressing Diesel and Other Sources of Black Carbon**

Norway – *Ingrid Myrtveit, Norwegian Climate and Pollution Agency, “Project Proposal: Reduction of Black Carbon from Residential Wood Combustion”*

Sweden – *John Munthe or Karin Kindbom, IVL Swedish Environmental Research Inst.*

Canada – *Manjit Kerr-Upal, Environment Canada*

Finland – *Seppo Sarkkinen, Ministry of the Environment of Finland*

Russia – *Elena Kobets, Environmental Rights Center Bellona, “Alternative Technologies for Reducing BC Emission in the Russian Arctic”*

**3:40** Break

**4:00 Roundtable Discussion of Possible Demonstration Projects & Next Steps**

– *Amund Bietnes, NEFCO*

– *Andrey Nedre, Director General of SRI Atmosphere*

– *RAIPON*

– *John Munthe, IVL*

**5:40** Meeting Concludes

**Figure 2. Workshop at EU Offices in Moscow**



## October 7, 2011 – Workshop Agenda

**Joint Workshop Steering Committee of ACAP:  
“Short-Lived Climate Forcers/Black Carbon,”  
Ministry of the Natural Resources and Environment of the Russian Federation  
& U.S. EPA**

Conference Hall

**09:30 – 10:00**

**Welcome, Introductions, and Opening Remarks**

*Irina Fominykh, MNRE*

*Jane Metcalfe, U.S. EPA*

*ACAP Chair*

*Chair of the Steering Committee*

**10:00 – 12:30**

**Black Carbon: Status of Scientific Assessments & Health Effects**

Moderator: *Jane Metcalfe, U.S. EPA*

**The Vector and Main Priorities in Russian Policy**

- Position of the Short-Lived Climate Forcers in ACAP and Arctic Council activity – *Andrey Peshkov, ACAP Chair*
- Short-Lived Climate Forcers in Göteborg process – *Sergey Vasilyev, MNRE*

**Black Carbon Report to Congress & Black Carbon under LRTAP: The Linkage to Air Quality and Public Health – *Erika Sasser, U.S. EPA***

**Russian Researches of the Black Carbon in Arctic – *Mikhail Kolomeev, Research and Production Association 'Typhoon'***

**Arctic Monitoring and Assessment Program (AMAP) Black Carbon Expert Group & Short-Lived Climate Forcers Arctic Council Task Force – *Ben DeAngelo, U.S. EPA***

**Black Carbon Emissions Management in the Russian Federation: Current Status and Room for Improvement – *Andrey Nedre, SRI Atmosphere***

**Focus on Stationary Diesel Generators in the Arctic**

- Emissions from Stationary Diesel Generators – *David Light, University of Alaska Fairbanks Center for Energy and Power*
- Problems of Diesel Usage at Indigenous Remote Communities in the Arctic – Overview and Summary – *Anatoliy Mikhailov, RAIPON*
- Review of Technologies to Reduce Emissions from Stationary Diesel Generators – *Frank Williams, University of Alaska Fairbanks Center for Energy and Power*

**12:30 – 1:30** Break

**1:30 – 2:00**

**Experiences from the Arctic Countries in Controlling Emissions from Diesel Generators – Overview and Summary**

*Ingrid Myrtveit, Norwegian Climate and Pollution Agency;*

*John Munthe/Karin Kindbom, IVL Swedish Environmental Research Institute*

*Michael Geller, U.S. EPA*

*Erika Sasser, U.S. EPA*

**2:00 – 3:00**

**Roundtable Discussion of Possible Assessment and ACAP Demonstration Projects on the black carbon emission reduction**

Moderator: *Andrey Peshkov, ACAP Chair*

**Further cooperation and possible joint projects:**

*MNRE*

*U.S. EPA*

*RAIPON*

*NEFCO*

**3:00 – 3:30 Workshop Conclusions & Next Steps**

**Figure 3. Workshop at MNRE**



## October 9-10, 2011 – Meeting Agenda

### Development of the Alternative Energy and Reducing Atmosphere Emissions in Remote Communities in the Russian Arctic Salekhard, Yamalo-Nenets Autonomous Okrug

#### October 9, 2011:

Site Visit to the Communities of Harsaim and Aksarka

#### October 10, 2011:

**10:00 – 12:00**

Meetings with Specialists

**2:00 – 5:00**

Meeting of the SLCF PSG and the WG of the Public Chamber of the Russian Federation on the issues of the remote areas of the north “Development of the Alternative Energy and Reducing Atmosphere Emissions in Remote Communities in the Russian Arctic”

- Opening of the Meeting – *Pavel Sulyandziga*
- Welcoming Speech – *Sergey Kharyuchi*
- The Initiative to Reduce Black Carbon from Diesel Sources in the Russian Arctic – *Jane Metcalfe, Teresa Kuklinski and Michael Geller, U.S. EPA*  
– *David Light, University of Alaska Fairbanks Center for Energy and Power*
- NEFCO – *Amund Beitnes*
- Department of Energy, Housing Maintenance and Public Utilities Complex of the Yamal-Nenets Autonomous District – *Natalja Samofalova*
- Department for Development of the Agroindustrial Complex of the Yamal-Nenets Autonomous District – *Andrey Revnivikh*
- Roundtable Discussions
- Summary

**Figure 4. Salekhard: Site Visit to the Arctic Circle**





## October 12, 2011 – Regional Seminar Agenda

### Effects of Black Carbon (Soot) Emissions from Mobile and Stationary Sources in the Arctic and Abatement Strategies including Transition to Cleaner Technologies Murmansk

#### Purpose of the Workshop:

- To provide information about black carbon assessments of the Arctic
- To discuss the links between diesel emissions and black carbon
- To discuss the outcomes of the meetings on Oct. 6-7 in Moscow and Oct. 9-10 in Salekhard
- To identify potential demonstration projects and next steps

#### 9:00 Welcome, Introductions, and Opening Remarks

*Government of Murmansk Oblast*

*Jane Metcalfe, Senior Adviser, U.S. EPA*

#### 9:15 Black Carbon and its Environmental Effects: Status and Discussions

Black Carbon Diesel Initiative in Russian Arctic

– *Jane Metcalfe, Teresa Kuklinski and Michael Geller, U.S. EPA*

– *David Light, University of Alaska Fairbanks Center for Energy and Power*

#### 10:45 Break

#### 11:00 Environmental Protection in the Murmansk Oblast: Current Status

– *Alexey Smirnov, Committee for Industrial Development, Ecology and Nature  
Management of the Murmansk Oblast*

#### 11:30 Discussion and Conclusions

#### 12:20 Meeting Concludes

#### 12:20 Lunch

#### 1:30 – 5:00 Site Visit to the Diesel Power Station in Drovyannoye Settlement

**Figure 5. Murmansk: Site Visit to Russian Arctic's Largest City**





## Participant Lists

### October 6, 2011 – Workshop Participant List

Name	Organization
Bruce Anderson	Starcrest CG
Hanne Aronsen	Climate and Pollution Agency, Norway
Amund Beitnes	Nordic Environment Finance Corporation (NEFCO)
Irina Bogdan	Ministry of Energy of the Russian Federation
Elena Bondarchuk	Fund for Sustainable Development
Olga Bragina	All-Russian Thermal Engineering Institute (VTI)
Valery Chashchin	Northwestern Scientific Centre for Hygiene and Public Health
Benjamin DeAngelo	U.S. Environmental Protection Agency
Natalya Dobrovolskaya	U.S. Embassy
Olga Doronina	A.N.Sysin Scientific Research Institute for Human Ecology and Environmental Hygiene
Andrew Eil	U.S. State Department
Oleg Fokin	Fund for Sustainable Development
Henrik G. Forsstrom	Nordic Environment Finance Corporation (NEFCO)
Jim Gamble	Aleut International Association
Mike Geller	U.S. Environmental Protection Agency
Sergey Gromov	Institute of Global Climate and Ecology (IGCE)
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Manjit Kerr-Upal	Environment Canada

October 6, 2011 – Workshop Participant List (cont.)

Karin Kindbom	IVL Swedish Environmental Research Institute
Elena Kobets	Bellona
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Yuliy Kunin	Scientific Research Institute for road transport
Chris Laskowski	U.S. Embassy
Alex Levinson	Pacific Environment
David Light	University of Alaska Fairbanks Center for Energy and Power
Jane Metcalfe	U.S. Environmental Protection Agency
Anatoly Mikhailov	RAIPON
Vladimir Moshkalo	UNEP Moscow Office
John Munthe	IVL Swedish Environmental Research Institute
Ingrid Myrtveit	Climate and Pollution Agency
Andrey Nedre	SRI Atmosphere
Mikell O'Mealy	U.S. Agency for International Development
Alexander Petkov	US Department of Agriculture, Forest Service
Migmar Pinigin	A.N.Sysin Scientific Research Institute for Human Ecology and Environmental Hygiene
Olga Popovicheva	SINP Moscow State University
Lars-Otto Reirsen	Arctic Monitoring and Assessment Programme (AMAP)
Boris Revich	Institute of Economic Forecasting, RAS
Vladimir Romanenkov	All-Russian Research Institute for Agrochemistry
Alexander Romanov	SRI Atmosphere
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Seppo Sarkkinen	Ministry of the Environment Finland
Erika Sasser	U.S. Environmental Protection Agency

October 6, 2011 – Workshop Participant List (cont.)

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Anna Vinogradova	A.M. Obukhov Institute of Atmospheric Physics RAS
Marianna Voevodskaya	CRDF-NSF Cooperative Programs/Science Liaison office, U.S, Civilian Research & Development Foundation
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Frank Williams	University of Alaska Fairbanks Center for Energy and Power
Brooks Yeager	Clean Air – Cool Planet
Maria Zamyatina	LMSU



## October 7, 2011 – Workshop Participant List

<b>Russian Participants</b>	
Irina Fominykh	Deputy Head of Department, MNRE
Elena Vikulova	Deputy head of Division, MNRE
Sergey Vasilyev	Advisor, MNRE
Andrey Peshkov	Arctic Contaminants Action Program
Irina Bogdan	Ministry of Energy of the Russian Federation
Ruslan Butovskiy	Fund for Sustainable Development
Natalya Dobrovolskaya	U.S. Embassy
Vladimir Moshkalo	UNEP Moscow Office
Olga Popovicheva	SINP Moscow State University
Alexander Romanov	SRI Atmosphere, Saint-Petersburg
Pavel Sulyandziga	RAIPON, Moscow, Russian Federation
Anna Vinogradova	A.M. Obukhov Institute of Atmospheric Physics RAS
Elena Kobets	Bellona, St. Petersburg
Boris Revich	Institute of Economic Forecasting, RAS
Yuri Samsonov	Institute of Chemical Kinetics and Combustion, Novosibirsk
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Sergei Tambiev	Shirshov Institute of Oceanology RAS
Vladimir Kopeikin	Institute of Atmospheric Physics RAS
Anatoly Mikhailov	RAIPON, Moscow
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Vladimir Romanenkov	All-Russian Research Institute for Agrochemistry
Vladimir Shevchenko	Shirshov Institute of Oceanology RAS
Valery Chashchin	Northwestern Scientific Centre for Hygiene and Public Health, St. Petersburg
Mikhail Kolomeev	Research and Production Association 'Typhoon'

October 7, 2011 – Workshop Participant List (cont.)

<b>Foreign Participants</b>	
Jane Metcalfe	U.S. EPA, Washington, DC, USA
Bruce Anderson	Starcrest CG Poulsbo, WA, USA
Amund Beitnes	Nordic Environment Finance Corporation (NEFCO), Helsinki, Finland
Mike Geller	U.S. EPA, Washington, DC, USA
Ann-Sofi Israelson	Swedish EPA, Stockholm, Sweden
Karin Kindbom	IVL Swedish Environmental Research Institute, Gothenburg, Sweden
David Light	University of Alaska Center for Energy and Power Fairbanks, AK, USA
Mikell O'Mealy	U.S. Agency for International Development, Moscow
Erika Sasser	U.S. EPA, Research Triangle Park, NC, USA
Frank Williams	University of Alaska Center for Energy and Power Fairbanks, AK, USA
Cristina-Astrid Hansell	U.S. Embassy, Moscow
Andrew Eil	U.S. State Department, Washington, DC, USA
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Ingrid Myrtveit	Climate and Pollution Agency, Oslo Norway
John Munthe	IVL Swedish Environmental Research Institute, Gothenburg, Sweden
Michael Walsh	ICCT Arlington, VA, USA
Galen Hon	The International Council on Clean Transportation, Washington, DC, USA
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James Gamble	Aleut International Association Anchorage, USA
Benjamin DeAngelo	U.S. EPA, Washington, DC, USA
Manjit Kerr-Upal	Environment Canada Gatineau, Quebec, Canada
Seppo Sarkkinen	Ministry of the Environment, Helsinki, Finland

### October 8-11 – Meeting Participant List

<b>Name</b>	<b>Organization</b>
Sergey Kharyuchi	Legislative Assembly of Yamalo-Nenets Autonomous District, RAIPON
Jane Metcalfe	U.S. EPA
Vasily Stepanov	Yamal-Nenets Autonomous District
Sergey Sizonenko	Committee on the Affairs of Indigenous Peoples of Taymyr, Rural and Commercial Farming in the Council of Taymyr Municipal District of Krasnoyarsk Krai
Elena U	RAIPON
Anatoly Mikhailov	RAIPON
Lidiya Vello	Department for Indigenous Peoples of the North of Yamalo-Nenets Autonomous District
Teresa Kuklinski	U.S. EPA
Natalja Samofalova	Department for Energy, Housing Maintenance and Public Utilities Complex of the Yamal-Nenets Autonomous District
Michael David Geller	U.S. EPA
Amund Beitnes	Nordic Environment Finance Corporation (NEFCO) (Finland)
David Edward Light	University of Alaska Center for Energy and Power Fairbanks, AK, USA
Andrey Revnivkykh	Department for Development of Agroindustrial Complex of the Yamal-Nenets Autonomous District
Vladimira Garmider	Public Chamber of the Yamal-Nenets Autonomous District
Sergey Khudi	Association of Indigenous Peoples of the North Yamalo-Nenets Autonomous District
Yuri Sidorov	Fuel and Energy Complex Fund for Innovative Development of the Yamal-Nenets Autonomous District
Vladimir Shvetsov	Public Chamber of the Russian Federation
Dmitry Afanasjev	Department for Construction, Housing Maintenance and Public Utilities
Alexander Karpov	Department for Construction, Housing Maintenance and Public Utilities of Priuralski Area
Alexander Gorlov	OOO "Geolog-Invest"



## October 12, 2011 – Regional Seminar Participant List

<b>Name</b>	<b>Organization</b>
Jane Metcalfe	U.S. EPA
Andrey Nedre	SRI Atmosphere
Oleg Krapivin	Committee of Industrial Development, Environment and Nature Management of the Murmansk Oblast
Vladimir Khrutskiy	Natural Resources Management Service, Murmansk Branch
Svetlana Bulatova	Environment and Nature Management of the Murmansk Oblast
Michael Geller	U.S. EPA
Nikolay Dobrokhoto	SRI Atmosphere
Elena Kobets	Bellona
Tatiana Korotkova	Murmansk Administration for Hydrometeorology and Environmental Monitoring
Teresa Kuklinski	U.S. EPA
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Dmitriy Makarov	Kola Science Centre
Natalya Malysheva	Sanitary and Environmental Laboratory, Murmansk
Olga Mokrotovarova	Administration for Hydrometeorology and Environmental Monitoring
Maya Petrochenkova	Federal Service for Customers' Rights Protection and Human Wellbeing Control
Sergey Polyakov	Murmansk Fishing Port (JSC)
Alexander Prohorov	Centre of Laboratory Analysis and Technical Measurements of Murmansk Region (FGA)
Alexander Romanov	SRI Atmosphere
Evgeniy Ryabtsev	Murmansk Combined Heat and Power Station (JSC)
Sergey Sirota	Murmansk Shipping Company (JSC)
Alexey Smirnov	Environment and Nature Management of the Murmansk Oblast
Renata Khardikova	SRI Atmosphere

## MNRE Press Release

### **Minprirody of Russia Held a Joint Seminar with the U.S. EPA on Arctic Contamination from Black Carbon (Soot Carbon)**

The event took place 7 Oct. 2011 under the Environmental Working Group of the Binational Presidential Commission and the Arctic Council Working Group on Eliminating Arctic Pollution [sic] (ACAP).

The meeting considered the problem of black carbon emissions. Its reduction will necessarily slow the rate of heating of the Arctic surface and moderate the melting of polar snow and ice.

Participants noted the inadequacy of research on black carbon emissions and impacts, and the need for additional study.

The Russian side stressed the need to take steps to regulate short-lived climate factors—in particular, to reduce black carbon emissions from stationary diesel generators in the Arctic. According to expert opinion, this step will offer the quickest and most effective result in reducing the rate of Arctic ice melt and greenhouse gas emissions.

Meeting participants endorsed the need to develop and execute joint ACAP projects targeting reduced black carbon emissions.

An outcome of the seminar was the opportunity to formulate and implement a package of projects to be financed from the Arctic Council Project Support Instrument.

Readers are reminded that the Russian Federation was the first Arctic Council nation to sign the agreement to collect and provide financing to implement Arctic environmental initiatives, and allocated 10 million euros to the Arctic Council.

Seminar participants included a wide range of experts from interested scientific institutes and organizations in Russia, the USA, and other Arctic Council member nations, Russian federal government officials, public and nongovernmental organizations.

10 Oct. 2011

RF Minprirody Press Service

Black carbon (soot carbon) appears as a result of incomplete combustion of carbon-based fuel and biomass. Its sources can be natural fires, but the majority of emissions occur as a result of anthropogenic factors. The atmospheric residence time of black carbon is not great—from several days to a couple weeks, owing to washout from precipitation.