Meeting Summary
Best Practices Training:
Arctic Black Carbon: Reduction of Black Carbon from Diesel Sources

The Murmansk State Technical University and Battelle organized a best practices training seminar on diesel black carbon inventories in Murmansk, April 15-19, 2013. Through the seminar, we convened a range of experts and speakers covering global black carbon inventories and measurements, Russian inventory systems, and specific data approaches for Murmansk.

The workshop began with a welcome from Murmansk State Technical University, and an overview of the project. Dr. Tami Bond (University of Illinois-Urbana) presented on global black carbon inventories and techniques for measuring black carbon emissions. Meredydd Evans (Battelle) presented on the proposed project data collection and inventory methodology; she also shared two presentations on EPA black carbon and transportation inventory systems. Dr. Alexander Nakhutin (Institute of Global Climate and Ecology) presented ideas on creating a Russian black carbon inventory system. Olga Kislova (Mosecomonitoring) described Moscow's efforts to monitor and reduce particulate emissions. Dr. Vladimir Malyshev, Svetlana Tretyakova, Alexander Barinov and Evgeny Gusev all presented on Murmansk data and data collection approaches, as well as inventory methodologies. These included presentations on diesel generators, and traffic/vehicle assessment methods. The attached agenda provides additional details on the speakers and discussion topics.

The participants had robust discussion on how best to adapt international practices to Russian circumstances. The discussion was very helpful in updating our project data collection methodology. For example, we updated the locations where we will conduct traffic video surveys to make them more statistically representative of road types in Murmansk city. We also developed new ideas on collecting and extrapolating data from enterprises, such as road maintenance, transportation and mining companies. Dr. Alexander Nakhutin suggested a new methodology for estimating off-grid diesel generators: comparing a map of populated settlements with a map of the electrical grid and estimating generator size and usage based on population size and existing data on generators in Murmansk. We also highlighted important questions that the project team will need to resolve in preparing the black carbon inventory. Fuel use data in Murmansk raise many questions; unusually, the statistics show that most diesel in the region is not used for transportation. We mapped out several next steps to try to crosscheck the fuel data, although this will likely remain an important area of uncertainty.

The seminar extended beyond the conference room as well. We were able to conduct demonstration measurements of emissions of black carbon and other pollutants at a bus depot (comparing a new and old bus), a 30-year old diesel generator at the university, and a modern passenger vehicle. We used these demonstrations to discuss approaches to measuring black carbon from a variety of sources, and in clarifying plans to measure emissions before and after installation of our pilot projects.

In addition, we were able to visit several sites relevant to diesel emissions in Murmansk. The Commercial Port gracefully provided an overview tour of the port, and shared information on port operations and the use of best practices such as electrified cranes, as well as the existence of diesel-operated equipment (the ports major uses of diesel include its large coal washing equipment, and the port trucks and vehicles). We also visited MSTU's vehicle inspection station, which provides required environmental and other inspections on private vehicles. The university maintains a database on the vehicles that pass through its

inspection station, including helpful information on vehicle age, share of diesel vehicles, kilometers traveled, and passing rates for environmental indicators (such as CO). The latter may provide a surrogate for estimating the distribution of super-emitters. Finally, MSTU arranged a visit to the Murmansk Demonstration and Educational Energy Efficiency Centre.

In conclusion, the best practices training seminar provided a vibrant dialog on diesel black carbon inventory and measurement methodologies that allowed us to strengthen our project inventory methodology.