HEALTH RISK RESEARCH DIALOGUE: A U.S.-RUSSIA PEER-TO-PEER PROGRAM TO IDENTIFY BEST PRACTICES FOR RESEARCH INVESTIGATING HUMAN HEALTH RISKS IN AREAS OF ECOLOGICAL DAMAGE

William Paul Robinson, Research Director (sricpaul@earthlink.net)
Southwest Research and Information Center, PO Box 4524
Albuquerque, New Mexico, USA 87106

INTRODUCTION

Environmental Health is defined as "the total of various aspects of substances, forces, and conditions in and about a community that affect the health and well-being of the population." (Mosby 2009). Community environmental health research considers the full range of environmental and technogenic ("man-made") influences on the well-being of human populations of concern. Where mines, mills and other industries that process materials containing significant heavy metal content have left a legacy of waste and abandoned facilities around the world, pollution control programs are developed for remediation of identified damage to land and water. Identification of the effects of heavy metal releases on health conditions in nearby communities through conduct of community environmental health research is more challenging and complex than identification of environmental damage — the contamination of land, water or air — and considers the health of people and other living things not just the damage to natural resources.

Many communities around the world share concern about effects of environmental releases on health. These shared concerns provide a basis for cooperative programs involving civil society organizations, residents of affected communities and public health and environmental scientists. Shared concerns for identification and remediation of inactive mines and mills, use of best practices in pollution prevention and clean closure at operating and proposed mines provide the foundation for a series of Mining and the Environment Exchange (MEE) program, conducted annually since 2007, focusing on the Lake Baikal watershed in Russia and Mongolia and the U.S. Southwestern states of New Mexico and Arizona. The MEE program has been conducted as a partnership between civil society organizations in both regions, involving Southwest Research and Information Center (SRIC) based in Albuquerque, New Mexico, USA, the Buryat Regional Organization on Baikal (BRO-Baikal) based in Ulan-Ude, Buryat Republic, Russian Federation (RF); Center for Citizenship Education (CCE) based in Ulaanbaatar, Mongolia; and Mongolian Environmental Civil Council (MECC) based in Ulaanbaatar, Mongolia. The MEE exchanges involve multi-sector delegations composed of a mix of civil society leaders, residents of communities affected by mine and mill releases, scientists, and regulatory agency staff in field programs conducted in New Mexico and Arizona and the Baikal Basin. These field programs have included mine tours, meetings with regulators and local scientists, and educational programs involving residents of communities near or affected by releases from mine sites. Participation by public health specialists from Buryatia in the 2014 MEE tour in the U.S. prompted interested in conducting an exchange program focused on public health research methods applicable to the communities affected by mine sites, rather than the identification of the extent of releases and remediation and pollution prevention methods of the MEE program. The shared interest in assessing the public health

impact of releases from mines and mills led to development of a Health Risk Research Dialogue coordinated by SRIC and BRO-Baikal.

The U.S.-Russia Peer-to-Peer Dialogue Program, established and funded jointly by the United States State Department and the Russian Federation Foreign Ministry, is currently being conducted by U.S. and Russian civil society organizations with similar interests, and has funded the SRIC and BRO-Baikal program plan for the Health Risk Research Dialogue in 2014. The U.S.-Russia Peer-to-Peer Dialogue Program issued $3,000,000 in grants of up to $100,000 to U.S. or Russia-based projects in 2013 and 2014, and has solicited applications for 2015 grants. (See http://moscow.usembassy.gov/us-russiadialogue.html)

The Health Risk Research Dialogue currently being conducted by SRIC and BRO-Baikal is formally titled "Project on Sharing Best Practices for Human Health Research in Communities Affected by Ecological Damage in Russia and the USA: A Peer-to-Peer Dialogue Engaging Scientists, Civil Society Organizations, and Affected Community Residents" was awarded a grant by the U.S.-Russia Peer-to-Peer Program for a one-year project to be completed by July 31, 2015. Internationally recognized research institutions in the U.S. and Russia providing letters of support for the program: the Community Environmental Health Program (CEHP), University of New Mexico, Albuquerque, New Mexico, USA and Federal Scientific Center for Medical and Preventative Health Management Technologies (FCRISK), Perm, Russia are actively involved in the Project.

- CEHP directed by Johnnye Lewis, Ph. D., Principal Investigator, Navajo Birth Cohort Study (NBCS), CEHP, College of Pharmacy, UNM; http://nbcs.healthyvoices.org/
- Federal Scientific Center for Medical and Preventative Health Management Technologies in is directed by Nina Zaitseva, D. Sc, website: www.fcrisk.ru

Health Risk Research Dialogue program coordinators are:

Sergei Gerasimovich Shapkaev, Ph. D., Executive Director, BRO-Baikal, website: www.esstu.ru/uportal/departments/bro_baikal.htm and

Paul Robinson, MCRP, Research Director and Health Risk Research Project Coordinator, SRIC, web site: www.sric.org.

The goal of the Health Risk Research Dialogue is to "share health research, public policy and community experience between U.S. and Russian partners to identify best practices for research investigating human health risk in areas of ecological damage."

The project anticipates achieving this goal through a series of bi-national webinars, exchange programs to the U.S. and Russia, and development and internet posting of a compilation of research, policy and risk avoidance recommendations and best practices using innovative methods for communication and compilation of project materials. The project focuses on development and use of rigorous research methods to characterize human health risk applicable to areas of environmental contamination in the Southwest U.S. and Buryat Republic of Russia south of Lake Baikal with the intention of integrating the research methods identified into health risk research programs being developed to assess risks for communities affected by environmental releases at many sites in the USA, Russian Federation and other countries.

The financial support from the U.S.-Russia Peer-to-Peer Dialogue Program grant has provided an excellent opportunity to discuss and compile information on best practices in public health, geochemistry, and community engagement applicable to populations affected by ecological damage from mine and mill sites in the U.S. and Russia. Key elements in the program plan being used for the Health Risk Research Dialogue are: 1) a "Webinar" Series – a series of six Seminar-like dialogues conducted in real-time on the Internet using Skype.com connections for audio and video discussions involving both U.S. and Russian participants, and 2) Field Trips and Seminars convened in the U.S. and Russia which include six participants traveling to the other country and participating in programs hosted by project partners.

Conduct of the Webinars and Field Trips requires extensive and frequent planning and coordination efforts from the project partners. Communication among SRIC and BRO-Baikal staff is conducted through email and Skype calls as needed. Interpretation and translation between Russian and English speakers and Russian and English language documents is an essential element in all aspects of the Health Risk Research Dialogue. Bi-lingual contractors for both SRIC and BRO-Baikal are included in the program plan supported by the U.S.-Russia Peer-to-Peer Dialogue.

HEALTH RISK RESEARCH DIALOGUE PROGRAM PLAN

Support from The U.S.-Russia Peer-to-Peer Dialogue for the Health Risk Research Dialogue provided for the conduct of the internet-based Webinar Series, a field trip and Seminar Series in the U.S. in November 2014, and a Russia field trip and Seminar Series scheduled for May 2015. Information generated through the on-line Webinars and Seminars conducted during the field trip has been posted at http://www.sric.org/russia_dialogue/index.php; the web address link for the <US-Russia Peer-to-Peer Dialogue> found on the <Our Projects> drop down menu at www.sric.org.

Through the end of March 2014, six Webinars have been conducted, including several conducted in with two sequential phases. Russian and English versions of documents compiled for these Webinars, including Agendas, Participant Lists, presentation materials, additional documentation provided by participants, and audio recordings of Webinar discussions are available on the Peer-to-Peer Dialogue pages on the www.sric.org website.

The Health Risk Research Dialogue was initiated with Webinar 1 on August 27, 2014. Webinar 1 provided an opportunity for all project partners to introduce themselves. Dr. Johnnye Lewis, UNM-CEHP Director, introduced two multi-year studies:

- The DINEH Project – A community-based research program to assess the role of environmental exposures on health in the Eastern Navajo Agency (website at http://hsc.unm.edu/pharmacy/healthyvoices/DiNEH_Project.html) and
- The Navajo Birth Cohort Study – A collaborative effort to study and determine whether uranium exposures affect birth outcomes and child development on the Navajo Nation (website at http://hsc.unm.edu/pharmacy/healthyvoices/NBCS/NBCS_Home.html).

The most extensive mining activity in the Navajo Nation has been uranium mining. While no uranium is currently being mined from sites within the Navajo Nation, a 23,000 square mile (60,000 square kilometer) region which includes portions of the states of New Mexico, Arizona and Utah, are where more than 1,100 uranium mines or "mine features" were operated and then abandoned within the Navajo Nation. These mines, ranging from small

adits — horizontal tunnels — where only 1,000 – 5,000 tons of uranium ore were extracted to underground mines greater than 300-meters deep producing more than 1,000,000 tons of uranium ore. Uranium ore in Navajo Nation mines typically contains 0.1 – 0.5% uranium and trace content of heavy metals including arsenic, cadmium, selenium and molybdenum, among others.

Russian specialists presenting summaries of the research methods being applied at Buryat Republic sites include:

Dr. Irina Mai, Deputy Director of The Federal Scientific Center for Medical Risk Management & Preventive Techniques for Public Health, Perm, Russia presented an overview of the Russian methods for "Detecting and Confirming Public Health Impacts in Areas of Environment that are Unacceptably Hazardous," and

Dr. Lyubov Makarova, Director of the Sanitary-Hygiene Monitoring Department of The Federal Inspection Service for Protecting Consumer Rights and General Public Health (Rospotrebnadzor) Republic Buryatia summarized the that agency's research approach in a presentation "issues related to establishing a cause-and-effect relationship between the health of local inhabitants and impacts from tailings and waste piles at the Dzhidinski Mine Site."

The Dzhidinski Mine site is the remains of Dzhidinski Kombinat, located in Zakamensk Rayon in the southwest portion of Buryatia, which operated during Soviet times. The Kombinat operations included underground and open pit mines where tungsten (wolfram) and molybdenum ores were extracted, milling facilities for processing the ores, and the wastes and other residues of the mines and mills. The Dzhidinski Kombinat operated from the mid-1930s – 1991 producing more than 60,000 tons of tungsten and 30,000 tons of molybdenum resulting in more than 40 million tons of tailings — processed ore — and 400 million tons of unprocessed mine waste rock surrounding two large open pit mines and an extensive array of associated underground workings. Dzhidinski ores contained up to 0.1 - 0.2% molybdenum and 0.148% tungsten occurring primarily as sulfide minerals and a range of heavy metals associated with the ore. The Dzhidinski Kombinat mines are found upstream of the 10,000 people in Zakamensk Rayon center and the mill buildings and tailings deposits are found in close proximity to residential and farming districts. (Robinson 2004)

The methods and practices being used in the health risk investigations in the Navajo Nation and in Zakamensk and archived on the project web page provide the examples of current and emerging research and community engagement "best practices" being shared among civil society, research and community leaders involved in the Peer-to-Peer Dialogue.

NOVEMBER 2014 FIELD TRIP AND SEMINAR SERIES

The U.S. Field Trip and Seminar Series for this program November 15-24, 2014 included site visits to mines and meetings with residents of communities near uranium sites within Navajo Nation. The Seminar Series, as with the Webinars, is documented with English and Russian version of the presentations and audio recordings of the Seminars on the Peer-to-Peer Dialogue pages at www.sric.org.

The Seminar Series included:

Day One - Wednesday November 19

(1A) Theory and Context of DINEH Project and Navajo Birth Cohort Study: Community Partnerships, Health Disparities and Intergenerational Exposures: Community needs, concerns and Contributions to disease relative to known risk factors (U.S. presenter)
(1B) Context of Health-risk Studies in Zakamensk, Buryatia, Russia (RF presenter)
Lunch - "The needs of local communities, review of medical statistics on the structure of morbidity in the area" - Edith Hood, Red Water Pond Road (Navajo) Community
(2A) Research, geographical and database tools for health-risk research (U.S.)
(2B) "A Pilot Program for Zakamensk: Presenting initial data with a proposed set of methodological approaches for assessing the quality of the local environment" (RF)
(3A) Statistically modeling DiNEH Project survey responses and geospatial data (U.S.)
(3B) Methodologies for public health risk assessments and statistical methods for analyzing data (RF)

Day Two - Thursday November 20

(4A) Biomedical Research on Effects of Multi-pathway Exposure to Metals Mixtures: Cardiovascular effects of inhalation of metals and fine particles (U.S.)
(4B) Biomedical Research on Health Risks of Mining Wastes in Zakamensk, Buryatia: Chemical Analyses in Bio-medical Investigations and the Foundation for Proving Possible Damage to Human Health (RF)
(5A) Mechanisms of toxicity: Immune response in a Navajo population exposed to uranium wastes (U.S.)
(5B) Immunological Considerations in Health Risk Research in Buryatia (RF)

Day Three - Friday November 21

Tour of laboratories in UNM Civil Engineering and Earth and Planetary Sciences Depts.
(6A) Multiple Pathways of Exposure to Metals in Mining Wastes: Physical-Chemical-Mineralogical Characterization of Uranium Mine Wastes: Waste characterization, water quality, particle-size research (U.S.)
(6B) "Assessment of changes in the content of toxic elements in soils around Zakamensk after the closing of the Dzhidinski Tungsten-Molybdenum Mill" (RF)
(7) Lunch: Discussion of Elements of Proposed Health Study in Zakamensk (RF)

The reports and presentations from the U.S.-Russia Health Risk Dialogue's U.S. Seminar Series and six Webinars offer readers a wide-range of current practices and methods in use in Russia and the U.S. for investigation of health outcomes in communities affected by environmental releases. These tools will be supplemented by the reports and presentations from a Russian Field Trip scheduled for May 13 – 27, 2015 including a field trip to Zakamensk and seminars in Zakamensk and Ulan-Ude.

REFERENCES

Mosby 2009 Mosby's Medical Dictionary, 8th Edition, Elsevier. (http://medical-dictionary.thefreedictionary.com/environmental+health

Robinson 2004 "Mining and Mineral Development Management Policy in the Selenga River Watershed," USGS/SB-RAS/MAS, Ulan-Ude, 2004 http://www.sric.org/mining/docs/USGS-siberia.pdf

Abstract:

A Health Risk Research Dialogue supported by the US-Russian Peer-to-Peer Dialogue has been convened by Russian Federation and United States colleagues to discuss their shared interest in identification of best practices in research methods associated community environmental health consequences of exposure to heavy metal pollutants in land, air and water. This Dialogue includes specialists from University of New Mexico Community Environmental Health Program in Albuquerque, New Mexico, USA, The Russian Federal Center for Health Risk Analysis in Perm, and leaders from communities addressed in USA – Navajo Nation, Arizona and New Mexico – and Russian investigations – Zakamensk, Buryatia. The program is coordinated by Buryat Regional Organization on Baikal, Ulan-Ude, Buryatia and Southwest Research and Information Center, Albuquerque, New Mexico, USA.