# USTUR NEWSLETTER

October 2015 / Issue 21 / USTUR-0385-15

## Direct from the Director

I am very pleased to have this opportunity of getting in touch with you again, and to talk about the history of the Registries. Perhaps not all of you know that the Registries are approaching a half-century mark. The idea to follow up nuclear workers (volunteer Registrants) who had documented accidental intakes of plutonium and other actinides was voiced in July 1966 during the "Plutonium Contamination in Man" meeting in Denver, CO. The predecessor of what is now the USTUR was formally established in August 1968 as the National Plutonium Registry at the Hanford Environmental Health Foundation (HEHF) in Richland, WA under contract to the United States Atomic Energy Commission (AEC). Today, the USTUR is the second longest research program funded by U.S. Department of Energy, Office of Domestic and International Health Studies. Studies of the Japanese atomic bomb survivors at the Radiation Effects Research Foundation (RERF) in Hiroshima and Nagasaki, Japan have been supported by DOE since 1947. This year, the USTUR was recognized by a visit of high level DOE officials. We had a fruitful discussion about past, present, and future of the USTUR.

To celebrate the USTUR's 50th anniversary, we proposed the following activities for 2016 – 2018: (i) to organize a one-day special session on the USTUR's research, *USTUR: Five Decade Follow-up of Plutonium and Uranium Workers*, at the Health Physics Society (HPS) 2016 Annual Meeting in Spokane, WA; (ii) to participate in the HPS Annual Meeting exhibition to promote the USTUR program; (iii) to publish a special issue of the Health Physics journal dedicated to USTUR history and research.

This plan was highly welcomed by members of Scientific Advisory Committee and DOE management. Additional funding was requested by the Registries to sponsor these activities. We all are very excited, and I am sure in the next year's newsletter I will have more to tell you about the 50th anniversary celebration. All these could not happen without your generous contribution, and I would like to thank all of you who have remained with the Registries for so many years. Our thanks goes to you as we wish you the very best of the holiday season.

Sergei Y. Tolmachev

# DOE Officials Visit

In March, Patricia Worthington, Isaf Al-Nabulsi, and Joey Zhou toured the USTUR. Dr. Worthington is the director of DOE's Health and Safety Office; Dr. Al-Nabulsi manages the Japanese atomic bomb survivor studies; and Dr. Zhou is the USTUR's program manager. Sergei Tolmachev gave a presentation on the USTUR's history, current research, and future plans. Significance of the USTUR's research and its impact on national and international radiation protection regulatory bodies was emphasized. During a laboratory tour, Dr. Tolmachev demonstrated the USTUR Case 0102 skull phantom.

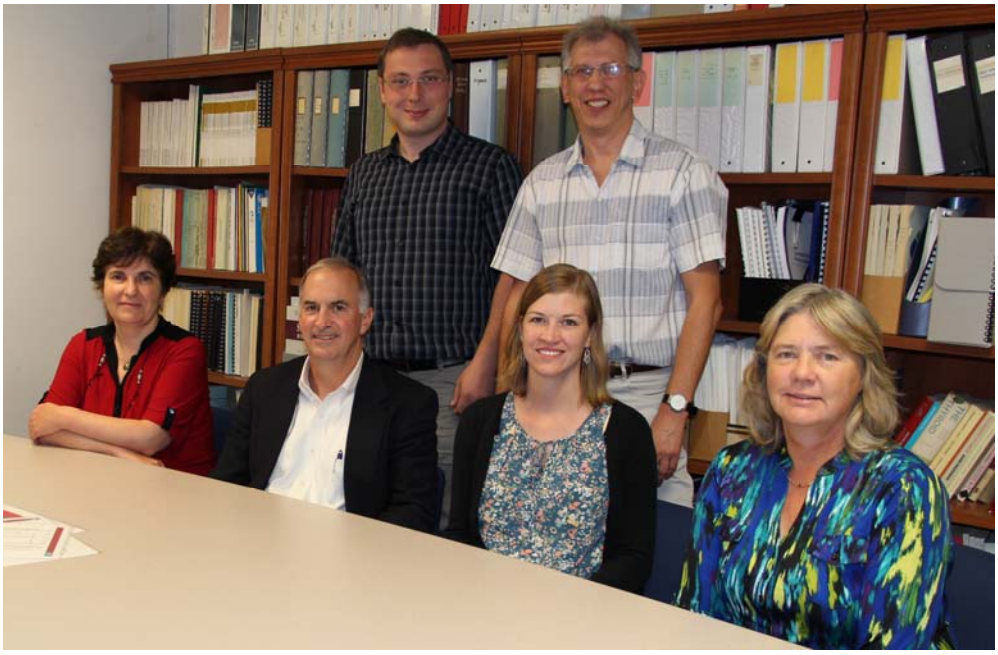
The 0102 skull phantom is a plastic cast of a head, which contains head bones from a USTUR donor who was exposed to americium. Since the amount of americium in the phantom is precisely known, it is utilized to calibrate radiation detectors that measure the amount of americium in a person's skull. The skull phantom recently travelled throughout Europe, to Canada, and back to Richland, WA as a part of a multi-country study that compared how well 22 different facilities were able to accurately measure the amount of americium in the phantom.

Following this visit, DOE's Acting Associate Under Secretary for Environment, Health, Safety, and Security - Matthew Moury - expressed interest in touring the USTUR. In August, Dr. Moury visited the USTUR where he spent two hours learning about the USTUR's mission, research achievements, and touring the laboratory facility.

USTUR director, Sergei Tolmachev, demonstrates the USTUR head phantom to Dr. Worthington (left), Dr. Zhou (middle), and Al-Nabulsi (right).

Communication with DOE officials is extremely important. It promotes awareness of the research carried out at the USTUR and opens the door for continued funding. The possibility of restoring the USTUR funding to 'historical' level (above $1,000,000 per year) was briefly discussed.

DOE officials were impressed by the level and quality of the USTUR research, and the resources available at the Registries.



Back: George Tabatadze, Sergei Tolmachev. Front: Maia Avtandilashvili, Matthew Moury, Stacey McComish, Margo Parker.

## Publications
## Making an impact

**4** papers published
**4** in press or ready to submit
**9** presentations

USTUR faculty have prioritized publishing data from Registrant donations during the past year. This includes submitting papers to scientific journals and giving presentations at workshops and meetings such as the Annual Meeting of the Health Physics Society.

## USTUR Case Study: Uranium Hexafluoride

Most of what we know about the radiological and chemical toxicity of a highly corrosive compound of uranium called uranium hexafluoride, $UF_6$ for short, comes from animal studies. Only a handful of scientific publications on human exposure to $UF_6$ are available.

The USTUR recently published a paper that focused on the distribution and retention of uranium in a USTUR Registrant after accidental inhalation of $UF_6$. An interesting and unusual observation was that a small amount of uranium from the accident was found in the Registrant's brain 65 years later. This indicates that uranium can cross the blood-brain barrier. The presence of uranium from the accident in the individual's lungs is also significant. Current guidance suggests that $UF_6$ is cleared from the lungs so rapidly that none should have been left when he passed away.

## Thinking Outside the Box: Environmental Exposures to Uranium

Uranium exists naturally in the world around us. This includes the air we breathe, and the food and water that we consume. Thus, our bodies contain a certain amount of uranium. The USTUR provides a unique opportunity to study just how much natural uranium is in the human body. This is done by identifying Registrants who worked only with plutonium, and, therefore, were not exposed to uranium at work.

In September, the USTUR published a paper about natural uranium in the tissues of three such Registrants. The concentrations of uranium in air/water/soil vary with geographical location. Thus, it was not surprising that the Registrant who lived in the Rocky Mountain plateau—which is known for high natural levels of uranium—had more uranium in his body than two Registrants from New Mexico. Also, uranium did not accumulate in the kidneys. This is important because the models that describe the movement of uranium through the body often assume that uranium is retained in the kidneys.

## Featured PRESENTATION

This year, the USTUR's director travelled to Washington, D.C. to present an overview of the USTUR at the Department of Energy's Annual Occupational Medicine Workshop. This was an excellent opportunity for the USTUR to improve its visibility by describing the Registries, its resources, and research to professionals who may not have otherwise heard of us. The workshop reached a broad audience by broadcasting presentations to offsite attendees through the internet.

## Plutonium IN THE LUNGS

Last year, we reported that the USTUR is working with scientists from the U.K and Russia to determine what amount of plutonium remains in the lungs due to a binding mechanism. We continued this research this year. The lung tissues from two more USTUR Registrants were analyzed. Our findings will be used by the International Commission on Radiological Protection (ICRP) in Publication 130: *Occupational Intakes of Radionuclides Part I.* This particular example shows how significant the USTUR's research is. ICRP publications serve as guidelines for radiation safety professionals worldwide.

Three papers about the distribution of plutonium and binding in the lungs of USTUR Registrants will be published as a part of a special issue of the Radiation Protection Dosimetry journal.

# DID YOU KNOW? Manhattan Project National Historical Park

Last December, Congress approved the creation of the Manhattan Project National Historical Park. This new park will preserve important sites associated with the Manhattan Project. One such site is Hanford's B-Reactor in Washington State. The B Reactor is the world's first full-scale nuclear reactor. Construction took just 13 months and it was completed in 1944. The B Reactor is open for public tours from April to September each year. Tours are free and have attracted more than 60,000 visitors from all 50 states and over 70 countries. From Enrico Fermi's office to the front face of the reactor, the tours offer an interesting glimpse into our nation's history. The Manhattan Project Historical Park will also include sites at Oak Ridge, TN, and Los Alamos, NM.

For more information about B Reactor tours visit: http://manhattanprojectbreactor.hanford.gov/

## New to the SAC

We would like to introduce you to **Thomas Rucker** . On October 1st, Tom joined the Scientific Advisory Committee as a radiochemistry representative. He has more than 40 years of experience in analytical chemistry, radiochemistry, and radiological detection and measurement. His experience and expertise will be a valuable asset to the USTUR's radiochemistry program and we look forward to working with him.

## A BIG THANK YOU!

To our Registrants for returning the work history questionnaire that we mailed in July. Our advisory committee had recommended that we gather information about where you worked before joining the nuclear industry. Job titles help us to understand better what workplace hazards you may have encountered. For example, work on home renovations or as a plumber may have resulted in exposure to asbestos.


Back row: George Tabatadze, Maia Avtandilashvili, Stacey McComish, Sergei Tolmachev. Front row: Florencio Martinez, Margo Bedell, Elizabeth Thomas.

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