

# Superfund Research Program

## CTUIR-OSU Partnership

2011 Update



## CTUIR-DOSE and OSU sample ambient air on Reservation and during salmon smoking

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The Department of Science and Engineering (DOSE) of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) in collaboration with Oregon State University (OSU) has completed 18 months of ambient air sampling on the reservation. Sampling air during traditional salmon smoking practices were conducted in Spring 2011. Mr. Stuart Harris and Dr. Barbara Harper oversee the project on the Reservation, and Dr. Anna Harding oversees the project at OSU.

Specifically, this project is investigating polycyclic aromatic hydrocarbons (PAHs), a family of chemicals produced during burning (soot, diesel and petroleum emissions, field and wood burning, and smoking foods).

Cigarette smoke is not included in this project.

# Ambient Air Sampling



Above: Jack Butler and Albertson White of the CTUIR change filters in the hi-vol air sampler.

Below left: Installing the air sampler in February 2010. From left, Jill Schrlau (OSU, Simonich Lab), Chen Shejun (OSU, Guangzhou Institute of Geochemistry, Chinese Academy of Sciences), Albertson White (CTUIR), and Jack Butler (CTUIR).

Below right: 24-hour air samples mailed back to Simonich lab.

In February 2010, several DOSE staff worked with the research team of Dr. Staci Simonich of OSU to install a high-volume ambient air sampler on the reservation. In this case, ambient air is general outdoor air. The sampler simultaneously collects PM<sub>2.5</sub> (particles with diameter less than 2.5 micrometer), PM<sub>2.5-10</sub> (particles with diameter of 2.5-10 micrometer), and PM<sub>10</sub> (particles with diameter greater than 10 micrometer). Researchers are particularly interested in PM<sub>2.5</sub> and PM<sub>2.5-10</sub> because these particles can travel deep into the lungs. Both small and large particles can be linked to health effects because of the chemicals that might be attached to their surfaces.

Ambient air sampling began in March 2010, and samples are collected for 24 hours. About 60 samples were collected in 2010. During March through May in 2010 and 2011, samples were collected

every other day. Samples are collected every 1 or 2 weeks during the rest of the year.

Ambient air samples are studied for PAHs and transformed-PAHs that formed as the particles travelled through the atmosphere. These changes happen because of UV light and interaction with other chemicals in the air. The type and amount of PAHs provide a chemical fingerprint that allows researchers determine the source of the particles in the air. Particles can come from Asia through trans-Pacific air currents, and some particles come from local sources in the Pacific Northwest regions. The Simonich group uses computer models to estimate the source of these particles.





# Traditional Salmon Smoking

This spring, Tribal volunteers were trained to use personal air samplers for sampling of air during salmon smoking. The term “personal air” refers to air that is in the area of a person’s breathing space. The air samplers collected PM2.5. The air samplers are small hand-held pumps that volunteers wore while they were inside the smoking structure. The fish were spring-run Chinook provided by a Tribal fisherman.

In addition to the personal air samplers used during the salmon smoking, the research team of Dr. Kim Anderson of OSU sampled the air in the smoke houses using passive sampling devices (PSD). The PSD is called “passive” because it does not need a power supply or any maintenance once it is set up. The PSD looks like a clear bicycle inner tube and absorbs chemicals from the air. The PSD were placed inside the smoking structure for the entire 3 days of the smoking process.

Personal air samplers and PSDs were used to sample air in both a traditional tipi and a smoke shed and were analyzed for PAH compounds. Smoke from both alder and apple wood types were analyzed. Researchers want to know if there are differences in PAH type and amount when using the two different types of wood and two different types of smoking structures.

To get a more complete picture of PAH exposure through food smoking activities, salmon and urine samples will also be analyzed for PAH levels. Anderson’s research team measured amounts of PAHs in the salmon before and after smoking. Simonich’s research team measured PAH levels in urine samples from Tribal volunteers doing personal air sampling before and after the salmon smoking process. If PAHs are inhaled in wood smoke, they can be detected several hours later in urine and reflect the total amount of PAHs that have been breathed in. These



Clockwise from top left:  
Salmon hanging in tipi; salmon filets in smoke shed; smoke shed; smoking tipi.

measurements will provide a better understanding of total PAH exposure during the smoking process.

## Training Videos for Tribal Volunteers

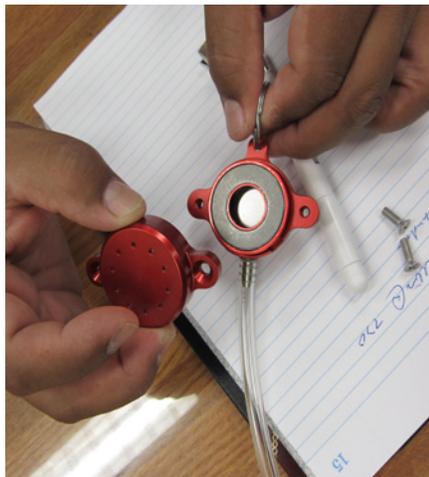
Training videos were produced by the Community Engagement Core to train members of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) how to use the personal air sampler and the PSDs. Tribal volunteers reviewed these videos just before the smoking activities began. The videos were very helpful in ensuring the consistent following of sampling protocols.

To view the training videos, visit:

<http://oregonstate.edu/media/srqvnhq>

and

<http://oregonstate.edu/superfund/training-using-personal-air-sampling-devices>



Above: Image from personal air sampler training video (top) and PSD training video (bottom)

Below: Tribal member wearing the personal air sampler while tending the fire inside the smoke shed.



# Material and Data Sharing Agreement

The Community Engagement Core created a Material and Data Sharing Agreement before any materials or data were collected. It is a formal document acknowledging that all data and scientific materials collected under this research project are the property of the CTUIR and that any publication or use of data or materials must be approved by the CTUIR. The document was approved and signed by OSU, Pacific Northwest National Labs, and the CTUIR. Additionally, the project received approval for human subjects research for the personal air sampling and for future focus group discussions with Tribal members from the OSU Institutional Review Board, the CTUIR Health Commission, and the Portland Area Indian Health Board.

Because of the importance of this type of document to protect tribes and the lack of existing examples and templates of similar documents, the Material and Data Sharing Agreement template was published in September 2011 in *Environmental Health Perspectives*, the journal of the National Institute of Environmental Health Sciences.

Harding A, Harper B, Stone D, O'Neill C, Berger P, Harris S, Donatuto J. 2011 Conducting Research with Tribal Communities: Sovereignty, Ethics and Data-Sharing Issues. *Environ Health Perspect* doi:10.1289/ehp.1103904

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