July/August/
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Polly Hennessey
Editor

"In most areas of the country, wood burning from fireplaces and woodstoves is the largest source of particle pollution generated by residential sources. It can contribute as much as 80% in the winter months."

Olympic Region Clean Air

TAMS/ITEP/EPA

Tribal Air Monitoring Outlook

Wood Stove Change Out

"Does your wood stove have a dirty little secret?"

Burn Wise, EPA

Old fashioned wood burning stove.

Modern wood burning stove.

Wood smoke from residences has become a point of issue in many tribal communities. The Environmental Protection Agency (EPA) has implemented a partnership program, *Burn Wise*, to assist communities in addressing this problem.

If the sight and smell of wood smoke curling out of a chimney evokes memories of "hearth and home" for many. For others it is a necessity for cooking and heating. Behind the memories or the necessities is the reality of what that smoke means for the environment and human health. Unlike fossil fuels wood is a renewable resource but with its sustainability come health and environmental risks.

The smoke from wood stoves or fireplaces contains many different chemical compounds including fine particulates, nitrogen oxides, sulfur oxides, carbon monoxide, volatile organic compounds and dioxins. Fine particulate matter emitted from wood smoke and soot may be the most dangerous. Inhaling these particles deeply into the lungs may result in breathing difficulties or permanent lung impairment.

According to EPA's Wood Heater Compliance Monitoring Program, "Residential wood heaters, which includes wood stoves, contribute significantly to particulate air pollution. EPA has regulated wood heater particulate emissions since 1988. Wood stove model lines that are in compliance with the rule are referred to as EPA-certified wood stoves. EPA's certification process requires manufacturers to verify that each of their wood stove model lines meet a specific particulate emission limit by undergoing emission testing at an EPA accredited laboratory." For further information go to: http://www.epa.gov/Compliance/monitoring/programs/caa/woodheaters.html.

Installed correctly and annually serviced a new wood stove should have a lifetime of 30 to 40 years.

- Make sure your wood stove is the right size for the room it is heating.
- Choose the proper fuel.
- Use appropriate burning techniques.
- Reduce the amount of firewood burned by making your house more energy efficient.

"Smoke coming out of your chimney is wasted energy."
Burn Wise, EPA

At present, there are approximately 29 million wood-burning fireplaces in U.S. homes. Fireplaces do not normally make up the primary heating source in homes; however, they do contribute a substantial amount of smoke-laden pollution into the air. This is a significant problem in high-density urban areas.

According to EPA (Burn Wise Home-Winter Tips) the energy efficiency and environmental benefits of replacing old wood stoves and fireplaces "can save fuel, money, time, resources and protect your family's health:

- 50 percent more energy efficient
- use 1/3 less wood for the same heat
- cut creosote build-up in chimneys that helps reduce the risk of fire
- produces 70 percent less particle pollution indoors and out
- reduces indoor and outdoor wood smoke pollution which has been linked to cancer, asthma and other serious health conditions
- improved combustion efficiency reduces CO2, methane and black carbon emissions
- save billions in health benefits each year."

For the most part, wood-burning fireplaces are not considered the most efficient method of heating a home. Unfortunately, most of the heat exits the house through the chimney, thus providing less heat. If you have central heating on while using the fireplace you are, in fact, asking the central heater to work harder in order to maintain an even temperature. Also, make sure to use only dry firewood in your fireplace or wood-burning stove. Wet or damp wood creates too much smoke which simply means wasted fuel.

According to EPA's Burn Wise program, "Smoke is made up of a complex mixture of gases and fine particles produced when wood and other organic matter burn. A major health threat from smoke comes from the particles (also called particle pollution, particulate matter or PM). These microscopic particles can get into your eyes and respiratory system, where they can cause health problems such as burning eyes, runny nose, and illnesses such as bronchitis."

Wood burning and indoor air pollution: Leaking smoke pollutants from stoves and fireplaces can exacerbate respiratory problems such as asthma or Chronic Obstructive Pulmonary Disease (COPD). It can also have an adverse effect on heart disease. If you or anyone in your family suffers from these conditions, it is recommended that you not burn wood at all. If it is a necessity

that you burn wood for heat or cooking purposes then it is imperative that your stove or fireplace does not leak and that it operates properly.

> *"Remember—if you can smell smoke, you are breathing smoke!"*
> *Pinal County Arizona, Dept of Air Quality*

What is in that smoke you are breathing? Some very powerful pollutants:

- Carbon Monoxide (CO) - this is an odorless, colorless gas that is produced when burning wood lacks sufficient air.
- Nitrogen Oxide (NO_X) - harms the respiratory system lessening its ability to fight infection.
- Volatile Organic Compounds (VOCs) - carbon-based chemicals that react with NO_X in sunlight to form ozone. VOCs indoors can be two to five times higher than VOCs outdoors. One of the easiest ways to limit indoor VOCs is to let the outdoors in —fresh air.
- Toxic Pollutants - some wood smoke can contain toxic and cancer-causing elements, such as benzene, formaldehyde and polycyclic aromatic hydrocarbons (PAH). PAHs are made whenever substances are burned, in this case, wood smoke. It should be noted that manufactured fireplace logs are not recommended as they produce toxic fumes, including PCBs.

Replace your old, inefficient wood stove with a cleaner, more efficient model. EPA set standards for wood stoves over twenty years ago. This means that the stoves must meet certain emission standards, so make sure the stove has the EPA certification. They must carry the EPA Emission Certification label. Your wood burning stove should be installed by a certified, professional installer.

If you would like more information on wood-burning stoves and fireplaces go to the following websites: www.epa.gov/woodstoves or www4.nau.edu/itep.

The following resources will give you more detailed information about wood burning stoves and fireplaces.

- "How to Burn Cleaner" Videos: Developed by Air Watch Northwest, these two 5-minute videos, "A Quick Guide on How to Select a New Stove for Home Heat" and "How to Operate Your Stove More Efficiently," provide tips on how to select and properly operate a wood stove. The videos may be accessed and downloaded at: http://www.airwatchnorthwest.org/homeheating/index.htm.

- For additional information on how to reduce wood smoke in your community, review the US EPA publication, "Strategies for Reducing Wood Smoke". It can be found at: http://www.epa.gov/burnwise/pdfs/StrategiesDoc8-11-09.pdf.

- Federal Programs to Support Changeouts: As a result of the American Recovery and Reinvestment Act, new announcements about funding are available and can be found at: http://www.energy.gov/recovery/funding.htm.

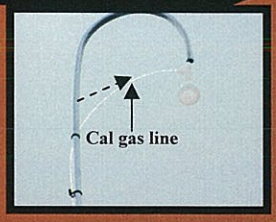
- Chimney Safety Institute of America (CSIA) is a non-profit, educational organization dedicated to chimney and venting system safety. They represent more than 1,000 chimney sweeps throughout the country that can help disseminate educational materials. Chimney sweeps are also an excellent source of information and can provide insight on local wood burning practices. CSIA can identify chimney sweeps in most communities. Go to: www.CSIA.org for more information.

"Burn sustainably harvested, properly processed and seasoned fuel in an advanced combustion stove or fireplace that is vented through a chimney that runs straight up through the building."

The Wood Heat Organization

One of the services provided by TAMS to the tribes is professional assistance. This assistance is often requested by the individual tribal air quality managers and may include on site support for monitoring equipment operation and maintenance, calibration and audits, data management and other related areas. The following are two articles relevant to this service provided by TAMS. The following was submitted by Glenn Gehring, TAMS.

The ozone calibration line is normally closed with an inline Teflon valve located inside. In this condition, sample air passes through the inlet and goes to the ozone analyzer through Teflon tubing routed inside the electrical conduit, then through the wall.

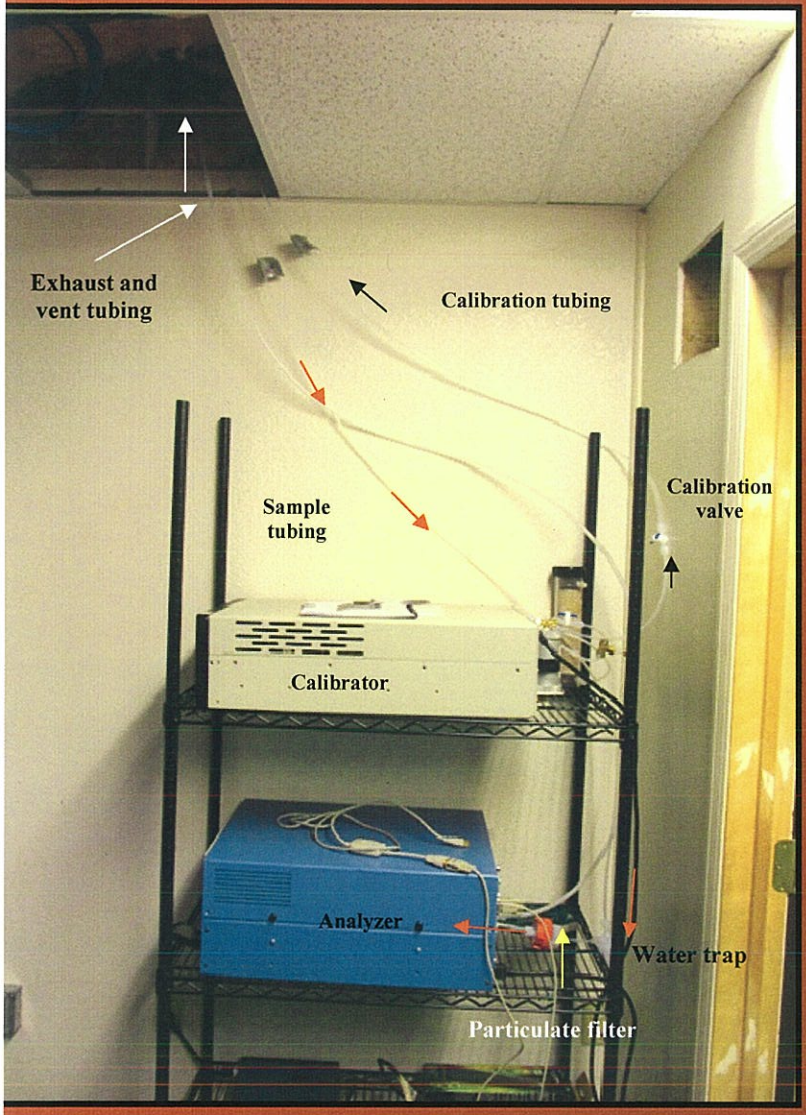


About a year ago, Alfonso Mahkewa, Environmental Specialist II at the Hopi Environmental Protection Office, requested assistance from the TAMS Center to help him conduct an initial ozone assessment at Hopi Nation. There are some large ozone precursor sources in the surrounding area and Alfonso wanted to determine if the existing ozone monitoring network adequately represented ozone concentrations at Hopi Nation. The closest ozone site was about 75 miles from the population area Alfonso wanted to assess, so it seemed reasonable for him to monitor ozone as part of the assessment.

Alfonso worked with Glenn Gehring, Technology Specialist at the TAMS Center, to develop a plan to assess ozone data by borrowing an ozone monitor and an ozone calibrator from TAMS for a 3-month monitoring project, and then compare hourly data gathered at the Hopi monitoring site with hourly data at the three nearest ozone monitoring sites. He contacted Farshid Farsi, TAMS co-Director, to see if he could borrow the ozone monitoring equipment through the TAMS equipment loan program. He also worked with his EPA project officer to see what they needed him to do for this program to conduct the ozone study. Alfonso worked with Melinda Ronca-Battista (TAMS Center) to develop a Quality Assurance Project Plan (QAPP) for the study. Alfonso also identified a monitoring site that met all siting requirements for regulatory ozone monitoring and could maintain the 20 to 30 degree Celsius room temperature the ozone analyzer required. Alfonso made an excellent choice for the siting of this project, the computer server room at the Hotevilla-Bacavi Community School. He also purchased ¼-inch FEP Teflon tubing and a variety of other specialty items needed for instrument installation and operation for the study period. Hopi environmental staff put considerable planning and effort into this project.

Once all the planning was done, through the Institute for Tribal Environmental Professionals (ITEP) Professional Assistance (PA) Program, Glenn Gehring traveled to Hopi Nation to assist with the ozone equipment installation and provide training. Lydia Scheer (ITEP) and Melinda Ronca-Battista also assisted by bringing separate ozone equipment and conducting an initial ozone audit after installation.

Alfonso did an excellent job installing the equipment and the initial data are very interesting, as well as somewhat surprising. To see how their site compares as the project progresses, they download raw hourly ozone data from Airnowtech.org. This website requires a free account and data are available in near-real-time. Airnowtech.org data are raw data that are not quality assured in the same way as data submitted to EPA's Air Quality System (AQS) database. However, there is considerable lag time in obtaining data from the AQS database. Sometimes it can take more than three months for AQS data to be submitted. Consequently, it is best to use Airnowtech.org during the study period and AQS data for the final analysis.



API Teledyne 401x Ozone Calibrator and Thermo 49i Ozone Analyzer

Below are two photographs depicting art-in-progress at the Hotevilla-Bacavi Community School. For more information about the school go to http://www.hbcschool.org/.

TAMS Professional Assistance at the Eastern Band of Cherokee Indians by Glenn Gehring

The following article was written by Glenn Gehring, a member of the TAMS staff. Glenn is a Technology Specialist providing professional assistance to tribes.

I completed travel to Cherokee, North Carolina. The travel was from March 4 through March 10, 2012. The travel was to provide Professional Assistance to Amy Smoker and Katie Renwick, air quality staff at the Eastern Band of Cherokee Indians (ECBI). They recently purchased a new monitoring shelter and requested assistance with installing an ozone analyzer, ozone primary standard, zero air generator and BAM 1020 configured for PM-2.5 FEM sampling. In addition, they requested assistance with troubleshooting and repairing a used 2025 sequential FRM PM-2.5 sampler that is to be collocated with the BAM, as well as instruction on rebuilding a 2025 sample pump.

When I arrived, the tribe did not have shelves or rack mounts for their equipment rack where the ozone equipment was to be installed. With my assistance, they built shelves from hardwood plywood. We then configured their ozone sampling system so they could routinely conduct their verifications through the probe (CRFs require that the single point checks must pass through the sample filter and as much of the sample collection system as practicable). This installation provided for ozone cal checks to pass through the entire sample collection system with the exception of a short 2-inch long tubing stub. The ozone equipment was connected to two dataloggers by using separate analog out connections from the equipment. After configuring and connecting to the dataloggers it became apparent there was a problem with the ozone analyzer. It turned out that one of the analog outs on the ozone analyzer was well calibrated and read properly on the datalogger, however, all the other analog out calibrations were off. We did some troubleshooting and verified it was the analyzer's analog out that was in error and calibrated it. This fixed the problem.

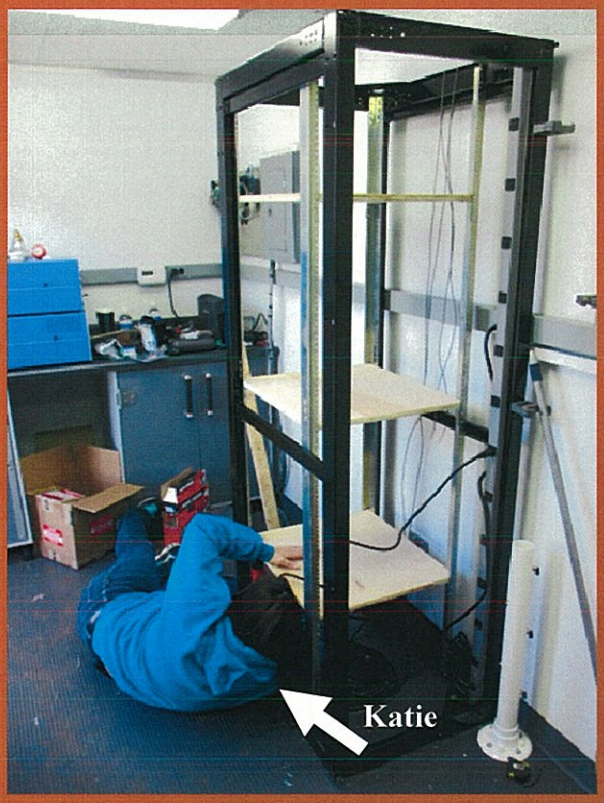
The BAM 1020 requires a vertical sample tube pass through the roof and that the PM-10 inlet opening be 2-meters above the roof. The tube must be straight up and level. They initially thought they would use an existing hole in the roof for this installation; however, that hole was designed for a gaseous glass manifold and the location would not work for the BAM. We identified another location inside the shelter where we could install the BAM. This created a problem. We needed to determine where that inside spot was on the ceiling when we were outside on the roof, and the roof was corrugated with high and low spots—we needed the plate of the outside to be on a high spot. We used the corner of the door and made a mark on the roof 6-inches in from the corner. Then we used where the manifold opening was as a second known location. This provided two locations that were known both inside and outside. Using triangulation (measuring from each known location to the spot), we marked an outside spot to drill through for the 2¼ inch hole. We then marked an inside spot to verify where the hole would be, avoiding electrical wires and lights. The tribe's maintenance staff drilled through from the top. Triangulation worked (this was a technique we used for as-builts when I designed wastewater systems, but I had never tried it like this before). The hole was well within an inch from where we expected it to be.

We did not have a permanent stand for the BAM, so we used a temporary stand. The final height above the roof was about 2-inches short of the 2-meters. They will adjust for this with the new stand when they receive it. The BAM was calibrated and configured for FEM PM-2.5 sampling. It is operational, just a couple of inches short on the outside.

We also fixed the 2025 sampler, I explained how all the sampler system worked, explored 2025 troubleshooting, and showed Amy how to rebuild a 2025 sample pump.

If you have any questions, please contact Glenn Gehring at (541) 612-0899 or Glenn.Gehring@nau.edu.

Installing, Building and Troubleshooting



EMPOWERMENT!!

Katie Renwick and Amy Smoker

Meet our staff
Melinda Ronca-Battista

Melinda Ronca-Battista

Melinda Ronca-Battista has been part of the TAMS staff since its inception in 2000. She is a certified Health Physicist and has degrees in both Health Physics and Physics from the University of Michigan. She is part of the Institute for Tribal Environmental Professionals (ITEP) located at Northern Arizona University (NAU) and through them is one of the instructors currently teaching courses for the American Indian Air Quality Training Program (AIAQTP).

Melinda, before coming to TAMS and ITEP, enjoyed a wide-ranging and varied career beginning with neutron activation analysis at the research reactor at the University of Michigan. She also worked at Fermi II power station, Fermilab research center and the University of Michigan Radiation Safety Office before moving to Washington DC where she worked for five years in the Office of Air and Radiation (OAR). At OAR, she worked with the indoor radon team, and along with RIENL's former Deputy Director, Richard Hopper, received EPA's gold medal for exceptional service.

After leaving OAR, Melinda worked for consulting firms doing audits of facilities where radioactive materials were used, including eleven audits of the radwaste safety program at Palo Verde Nuclear Power Plant in Tonopah, Arizona; Boeing research; radiopharmaceutical assembly firms and other laboratories. She has spent years doing audits of radiation safety programs at military bases, where she learned how radiation safety is implemented by our military. She has also conducted trainings, written numerous Quality Assurance Project Plans and spent more hours than she can count analyzing data.

Melinda now conducts training courses on the mechanics of writing QAPPs and believes that it is possible to make this an enjoyable task. One of her favorite challenges is to make delivery of the TAMS training courses more efficient. This includes working with a contractor to develop "turbo-QAPP" software onto CDs and putting five data management courses online and on CDs. These will provide example databases, excel analyses, data manipulations and general information management skills into an interactive, memorable rigorous format (featuring videos of the do's and don'ts of data management). She works on special TAM Center projects including a nine-tribe passive ozone study, radiation survey training at Church Rock, New Mexico, and the National Environmental Information Exchange Network (NEIEN) program. She also serves on several national committees representing tribal as well as small organization concerns to the national policy-making community, such as the workgroup to revise CFR requirements for ambient air monitoring.

Melinda loves the languages of statistics and quality assurance (really) and thoroughly enjoys deflating the balloons of scary (or perhaps merely boring) sounding terms and requirements into common sense and plain English. This means that attending a class taught by Melinda will not only open up the mundane world of stats and quality assurance to a higher level but that the student might just come away with not only a usable understanding of the subject but a bit of excitement when working with QA implementation.

ITEP Web Training

QA Keys for Tribal Grantees

Future dates for this webinar will be announced

This 90 minute webinar is designed for tribes who are now, or will soon be, gathering air monitoring data under a grant from the US EPA. The webinar will cover:

- **Terminology of QA/QC**
- **QAPPs and EPA's Graded Approach**
- **QC measurements required for gaseous and PM analyzers (in brief, with references covering specifics)**
- **The 4 types of audits, including those that are required for comparing data to the NAAQS**
- **PQAOs**
- **Data validation requirements**

When presented, handouts and references will be provided

For more information or questions about this webinar, please contact Melinda Ronca-Battista, 480-759-1544; fax: 480-706-0133; Melinda.Ronca-Battista@nau.edu.

AIAQTP Courses

July 31-August 2, 2012
Data Analysis & Interpretation
Pechanga, CA

October 10-12, 2012
Dataloggers
Las Vegas, NV

October 16-19, 2012
Introduction to Tribal Air Quality
Flagstaff, AZ

December 4-7, 2012
Tribal Participation in the SIP Process
Flagstaff, AZ

January 8-11, 2013
Treatment as a State (TAS) & Tribal Implementation Plan (TIP)
Seattle area

January 14-18, 2013
Air Quality Computations
Flagstaff, AZ

Contact: Lydia Sheer, Training Coordinator
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If you would like an electronic version of this newsletter, please let me know at: Hennessey.Paulette@epa.gov