

Air Quality & Wood Fired Heating Devices

Tom Chapple
Director of Air Quality
Alaska Department of Environmental Conservation

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Topics - Many Questions, Too Few Answers

- The Sources: Institutional Wood Boilers; Residential Outdoor Wood Boilers
- Permitting and Emission Limits
- Air Pollution and Health Concerns

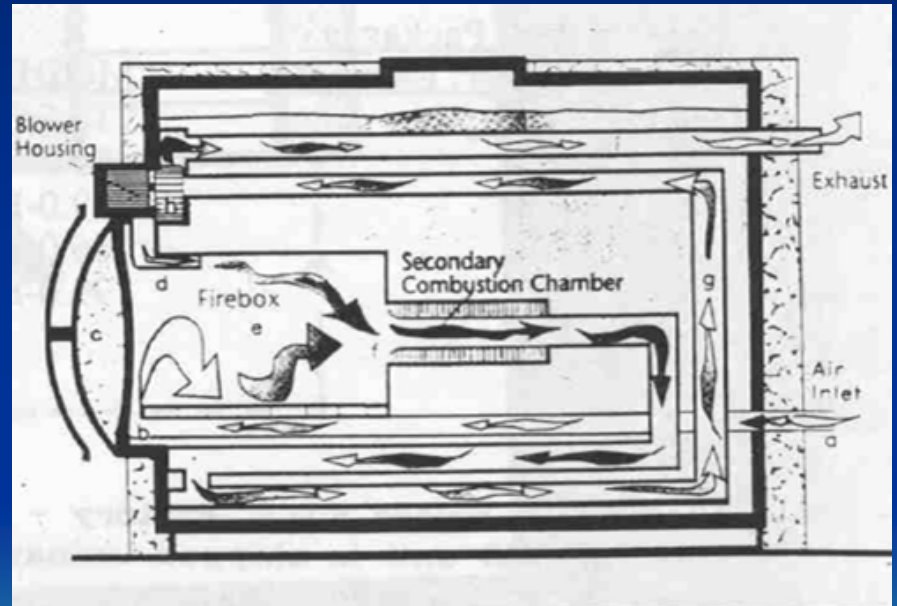
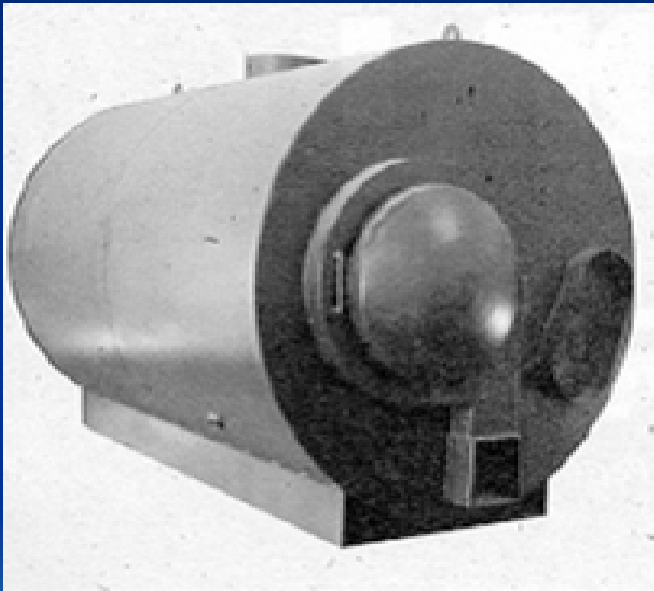


Wood Fired Combustion Sources




GARN Unit

- Thermal Energy storage via hot water recirculating (hydronic) system



Current Alaska Projects

- Tanana / Ionia (Kenai) Projects
 - Garn 2000; 2-units at each project
 - Rated at 425,000Btu each
 - Dot Lake Project
 - Garn 3200-similar unit
 - Rated at 950,000Btu
 - No post combustion zone emission controls
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Outdoor Wood Furnace Best Burn Practices

- Read and follow all operating instructions supplied by the manufacturer.
- **FUEL USED:** Only use listed fuels recommended by the manufacturer of your unit. **Never use** the following: trash, plastics, gasoline, rubber, naphtha, household garbage, material treated with petroleum products (particle board, railroad ties and pressure treated wood), leaves, paper products, and cardboard.
- **LOADING FUEL:** For a more efficient burn, pay careful attention to loading times and amounts. Follow the manufacturer's written instructions for recommended loading times and amounts.
- **STARTERS:** Do not use lighter fluids, gasoline or chemicals.



Outdoor Wood Furnace Best Burn Practices Cont'd

- **LOCATION:** It is recommended that the unit be located with due consideration to the prevailing wind direction.
- Always remember to comply with all applicable state and local codes.

(Provided by the Hearth, Patio and Barbecue Association (HPBA), Outdoor Furnaces Manufacturers Caucus.)



Examples of Outdoor Wood Boilers and Smoke Issue



Residential Outdoor Wood Furnaces

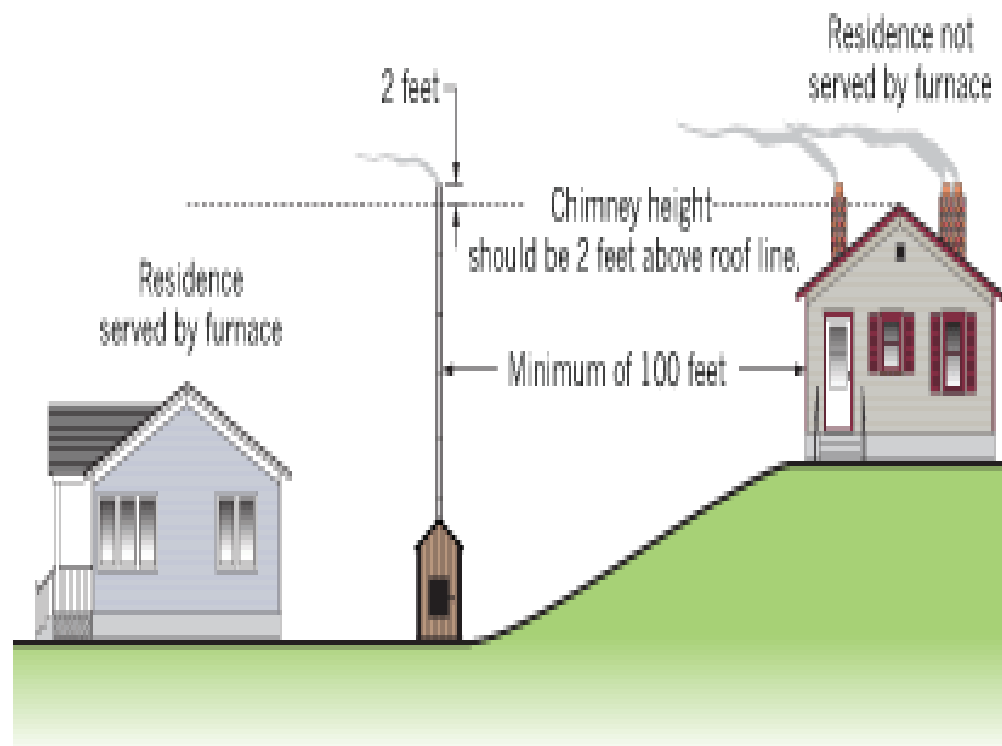
- Often sited in residential areas
- Smoke can impact neighbors
 - Nuisance
 - Health concern



Chimney Height Installation Scenario

Furnace should be located no less than 100 feet from any residence not served by the furnace.

If located within 100 feet to 300 feet to any residence not served by the furnace, it is recommended that the stack be at least 2 feet higher than the peak of that residence.



(Above provided by the Hearth, Patio and Barbecue Association (HPBA), Outdoor Furnaces Manufacturers Caucus.)

(from: <http://www.epa.gov/woodheaters/bestpractices.htm>)

Alaska Air Quality Regulations



Permitting Thresholds and Emission Limits



Permitting Thresholds

- Minor Sources (18 AAC 50.502):
 - Listed sources that have potential to violate health standards
 - Sources that emit > 15 tons of particle emissions (PM10; estimated at 8.6 MMBtu/hr wood boiler size);
- Major Source Operating Permit if 100 tons/ yr emission
 - emission wood boilers < 450,000 Btu/hr = less than 100 tons/yr
- Sources subject to federal emission limits:
 - Sub-Part Dc of New Source Performance Standards for >10 MM Btu/hr boiler threshold; emission limit for wood fired boiler if boiler is > 30 MM Btu/hr



Emission / Exhaust Limits

- 18 AAC 50.075: visible emission standards for wood-fired heating device – Applies only in wood smoke control areas
- 18 AAC 50.055: Specific pollutant concentration limits for Fuel Burning Equipment - Excludes wood-fired heating devices
- 18 AAC 50.110: Air Pollution Prohibited – Does apply; requires operator not to create pollution problems injurious to health and enjoyment of property



Air Pollution & Health Concerns

- Clean Air Act places duty on State to control pollution problems;
- State permitting and emission rules are designed for known air pollution sources that have potential to cause problems;
- Wood smoke pollution has been a serious problem, but its been wood stoves



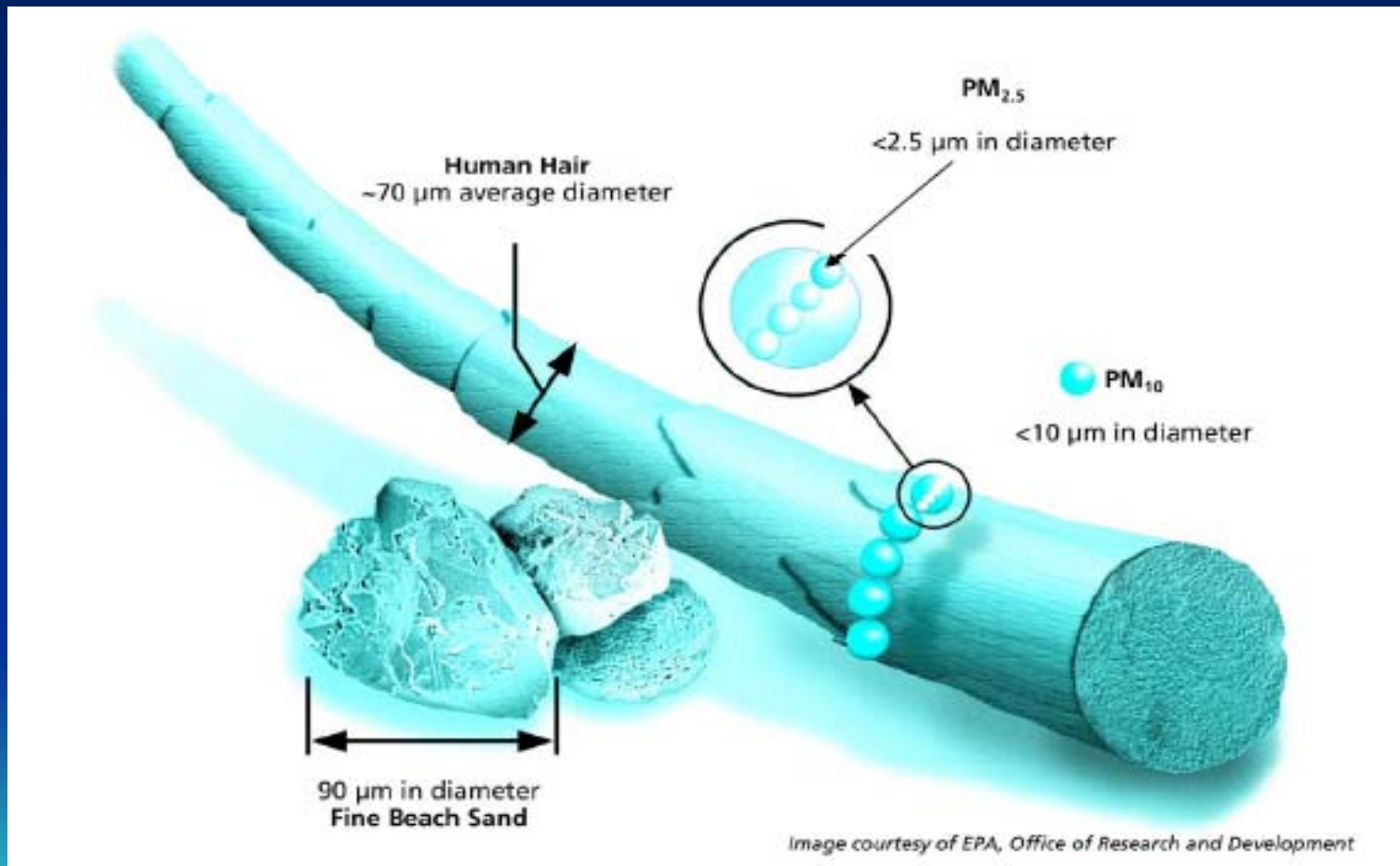
National Air Quality Health Standards

- Ambient health standard of greatest concern from wood burning is particulate matter
- Fine particulate matter standard
 - 35 $\mu\text{g}/\text{m}^3$ for 24-hour period
 - 15 $\mu\text{g}/\text{m}^3$ annually



Particulate Matter – What Is It?

A complex mixture of extremely small particles and liquid droplets



Particulate Matter Health Impacts

- **Particulate matter can penetrate to lower regions of the lung**
- **Deposited particles may accumulate, react, be cleared, or absorbed**
 - **Scientific studies link breathing particle pollution to significant health problems:**
 - **Aggravated asthma**
 - **Premature death in people with heart and lung disease**
 - **Increases in respiratory symptoms like coughing and difficult or painful breathing**
 - **Chronic bronchitis**
 - **Decreased lung function**



DEC's Conclusions

- Permitting and Emission Rules did not envision broad use of commercial wood boilers – little to no regulatory restrictions.
- Expansive use of wood fuels deserves a strong look at combustion design, pollution control technologies and attention to good site selection.
- Health consequences are real: switching from diesel to wood may save \$, health costs may exceed fuel savings.
- If pollution problems are evident, rules may need to be changed.
- More Questions, too Few Answers