Outdoor Wood Burner Stack Height Proposals

Forty years ago the phrase "*the solution to pollution is dilution*" was seen as a reliable method (since proven wrong) of dealing with local air pollution issues. This phrase has been reborn as a number of states, local municipalities and rural communities are in the process of considering **minimum** stack height requirements for outdoor wood burners (OWB's). All parties involved should become very aware of the ***liabilities and consequences*** of such regulation.

Safety Issues:

1. Requiring a stack height of X feet above any structure within a 50' to 200' radius creates a *very real liability* issue. OWB's should be utilized only in rural settings; thus a number of OWB's will be located on farms where silos, barns, or other tall structures are present. Thus a vertical stack could exceed 60' in height. At such a height, condensation within the stack **will** occur in the upper portions of the stack. Over time creosote will collect and the potential for a chimney fire will become significant. A chimney fire would be extremely hazardous and could lead to a *stack collapse*, thus triggering additional ground or building fires.

2. There appears to be no requirement for an insulated class A stainless steel stack within the proposed regulations. A single wall vertical stack serving a wood burning appliance will condense significant quantities of acidic water and creosote, throughout the stack height. The acid will corrode the stack (especially if the stack is not fabricated with stainless steel) and condensed creosote will create perfect conditions for a chimney fire. Any stack serving a wood fired appliance **must** be fabricated from stainless steel and be insulated to class A standards.

3. Likewise, any stack serving a wood fired appliance (OWB, stove, furnace, fireplace, etc) **will** require periodic cleaning. Cleaning a *free standing* 40' (or higher) vertical stack will be costly and/or difficult; thus cleaning will either not be done or done infrequently, leading to a critical condition with creosote loading (and chimney fire potential).

Structural Issues:

1. A tall stack may require a foundation to frost depth and at least one (maybe even several) set of guy wires (each set composed of 3 wires at 120 degree spacing) with appropriate anchors, to maintain stack stability and resist building code defined wind loads (normally 100 mph in *open* rural areas). Class A flue manufacturers specify a **maximum** vertical height which cannot be exceeded. Will the local governing body be putting forth *specifications* for the guy wires and anchors? Will there be *mandated* inspection procedures to insure proper compliance with local and/or stack manufacture regs? This is **NOT** a "structure" that should be left to the "home handyman."

2. During storms a tall stack will act as a lightning rod. Unless properly grounded, any lightning hit could produce dangerous side flashes (injuring or killing people) and could ignite creosote, again creating a chimney fire. Proper grounding generally requires: copper air terminal; 24 to 36 strand copper or aluminum down wire; correctly spaced stand offs and copper clad driven ground rods.

Performance Issues:

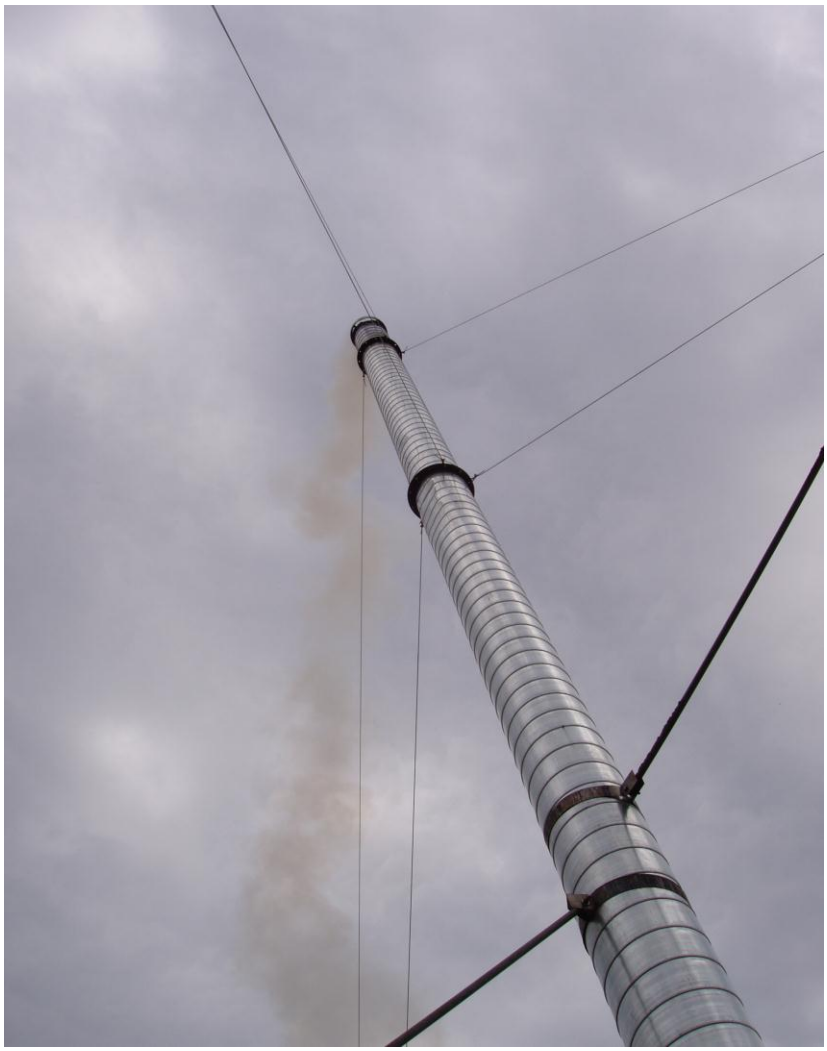
1. A wood unit that operates well with a 15' stack may become a bad performer with a 40' stack. Secondly, the "draw created by the stack" will increase considerably with stack height creating a dangerous overfire condition. Indeed, an excessively tall stack may violate the manufacturers listing (as would an excessively long horizontal flue for a condensing natural gas furnace).

2. Draft inducers can increase the flue gas exit velocity of a stack (common in commercial heating equipment). Higher exit velocities increase ambient air entrainment and dispersion of fine particulates. For instance, a 30’ stack with a draft inducer may yield better dispersion characteristics of fine particulates than a 40’ stack without an inducer.

Several states allow a reasonable stack height to be 15’ to 20’ for OWBs. Existing “on the books building codes” require a stack height of 2’ above anything within a 10’ radius of the stack when a wood burning appliance is located *within* the building. The only real solution to wood pollution is high efficiency, clean burning equipment such as a GARN® WHS unit.

An Example of a Tall Stack

Pictured below is a tall stack (about 32’) serving a typical OWB. It consists of a class A stainless steel flue slid *within* a spiral pipe to provide structural support. Note the 2 sets of guy wires and 1 set of rigid supports. Note that the wood smoke is high above the ground, but it continues to travel in a rather *tight formation* downwind. Furthermore, the plume *dropped to the ground* within a hundred yards of the stack. Thus the tall stack had *no effect* on *real* emission dispersion.



A picture of the original class A stainless steel flue that was inserted *within* the spiral pipe is shown below.

The picture below is of the inside of the class A flue. Note the condition and build up of deposits; primarily creosote and ash. Even though the class A flue was insulated condensation occurred due to the cooling effect of the 32’ stack height. And a chimney fire occurred in the top portion of the chimney. This chimney was 11 months old when replaced.

The picture below is an overview of the entire set up. This stack was *significantly taller* than anything in the area and still did not function to disperse the smoke as the smoke dropped back down to the ground within a hundred yards.

The real and only solution is *clean burning* wood equipment.

Compare the above tall stack with a **GARN® WHS** *horizontal flue* unit as shown below. The **GARN WHS** exhaust stream is **white water vapor**, not the brown toxic plume shown above.