

**AMERICAN LUNG ASSOCIATION GOVERNMENT RELATIONS POSITION
RESIDENTIAL WOOD COMBUSTION**

POSITION TITLE:

RESIDENTIAL WOOD COMBUSTION

DATE APPROVED:

April 24, 1999

COMMITTEE:

NATIONAL AIR CONSERVATION COMMISSION / SCIENTIFIC
ASSEMBLY ON ENVIRONMENTAL AND OCCUPATIONAL HEALTH

POSITION SUBJECT:

AIR CONSERVATION

POSITION TEXT:

THE AMERICAN LUNG ASSOCIATION CALLS FOR EFFECTIVE ENFORCEMENT OF EXISTING REGULATIONS AND ORDINANCES GOVERNING WOOD BURNING AND ENCOURAGES CITIZENS TO SUPPORT THE STRENGTHENING OR THE ENACTMENT OF SUCH, WHERE NEEDED TO PROTECT PUBLIC HEALTH.

THE AMERICAN LUNG ASSOCIATION ENCOURAGES THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (U. S. EPA), UNDER SECTION 111 OF THE CLEAN AIR ACT, TO RE-EVALUATE ITS WOODSTOVE CERTIFICATION STANDARDS WITH AN EYE TOWARD SUBSTANTIALLY STRENGTHENING THEM OVER TIME, REVISING THEM IN LIGHT OF THE MOST RECENT HEALTH DATA ON WOODSMOKE POLLUTION AND THE NATIONAL AMBIENT AIR QUALITY STANDARDS FOR PARTICULATE MATTER AIR POLLUTION.

IN ADDITION, INDIVIDUALS SHOULD AVOID BURNING WOOD IN HOUSES WHERE LESS POLLUTING HEATING ALTERNATIVES ARE AVAILABLE. THE USE OF THE LEAST-POLLUTING ALTERNATIVE HEATING METHODS AND CLEANER TECHNOLOGIES SHOULD BE PROMOTED TO PROVIDE USEFUL HEAT, WHILE MINIMIZING ANY ADVERSE HEALTH EFFECTS.

THE AMERICAN LUNG ASSOCIATION SUPPORTS POLICIES THAT MINIMIZE THE PUBLIC HEALTH IMPACT OF RESIDENTIAL WOODBURNING. EMISSIONS OF AIR CONTAMINANTS FROM WOODBURNING SHOULD BE REDUCED OR ELIMINATED, BOTH OUTDOORS AND INDOORS, SO EXPOSED POPULATIONS ARE NOT SUBJECTED TO CONCENTRATIONS OF POLLUTANTS THAT ADVERSELY AFFECT HEALTH.

BECAUSE OF THE NATURE AND PREVALENCE OF WOODSMOKE POLLUTION AND ITS HEALTH EFFECTS, THE AMERICAN LUNG ASSOCIATION RECOMMENDS THAT MORE RESOURCES BE DEVOTED TO RESEARCH, SPECIFICALLY IN THE FOLLOWING AREAS:

- 1) THE PREVALENCE AND RELATIVE IMPORTANCE OF WOODSMOKE AS A COMPONENT OF AIR POLLUTION IN RESIDENTIAL AREAS ACROSS THE COUNTRY;
- 2) THE ACUTE, CHRONIC, AND POTENTIAL CARCINOGENIC HEALTH EFFECTS OF WOODSMOKE POLLUTION, IN CHILDREN AND ADULTS, ESPECIALLY AMONG THOSE WITH PREEXISTING CARDIOPULMONARY DISEASE; AND
- 3) THE RELATIVE IMPORTANCE OF WOODSMOKE IN CONTRIBUTING TO INCREASED MORTALITY, MORBIDITY, AND CERTAIN WELL-DEFINED ADVERSE HEALTH OUTCOMES, BOTH NATIONALLY AND WITH ATTENTION TO CERTAIN AFFECTED LOCALITIES.

BACKGROUND:

IN MOST AREAS OF THE COUNTRY, WOOD COMBUSTION IS THE LARGEST SOURCE OF PARTICULATE AIR POLLUTION (PM) GENERATED AT THE RESIDENTIAL LEVEL. INDEED, IN SOME LOCALITIES, FIREPLACES AND WOODSTOVES HAVE BEEN IDENTIFIED AS THE SOURCE OF 80% OR MORE OF ALL AMBIENT PARTICLES SMALLER THAN 2.5 MICRONS IN DIAMETER (PM_{2.5} OR FINE PM) DURING THE WINTER MONTHS. A LARGE BODY OF EVIDENCE LINKS PM WITH ADVERSE HEALTH OUTCOMES, INCLUDING EXCESS MORTALITY, ESPECIALLY AMONG THOSE WITH PREEXISTING CARDIOPULMONARY ILLNESS.

FIREPLACES AND WOODSTOVES, AND EVEN SPECIAL EQUIPMENT SUCH AS WOOD PELLET COMBUSTORS AND EPA PHASE II CERTIFIED WOODSTOVES -- AS DESIGNED -- PRODUCE ORDERS OF MAGNITUDE MORE PM THAN WELL-TUNED OIL OR GAS DEVICES PRODUCING EQUIVALENT HEAT.

MOREOVER, WOODSTOVES ROUTINELY PRODUCE SEVERAL TIMES MORE AIR POLLUTANTS THAN ORIGINAL DESIGN VALUES SIMPLY BECAUSE OF IMPROPER OPERATION (INCLUDING THEIR MISUSE AS INCINERATORS FOR RESIDENTIAL REFUSE), MAINTENANCE, AND NORMAL EQUIPMENT DEGRADATION WITH USE. ACCORDING TO THE U. S. DEPARTMENT OF ENERGY, WOODSTOVES WERE USED TO BURN OVER 70 PERCENT OF THE 34 MILLION TONS OF RESIDENTIAL WOOD COMBUSTED IN 1990.

MORE THAN 90% OF THE WOODSMOKE PARTICLE MASS CONSISTS OF FINE PARTICLES, THE FRACTION OF PM THAT MANY RESEARCHERS CONSIDER TO HAVE THE GREATEST

ASSOCIATION WITH ADVERSE HEALTH OUTCOMES. IN ADDITION TO FINE PM, WOODSMOKE EMISSIONS CONTAIN COMPONENTS SUCH AS CARBON MONOXIDE (AN ASPHYXIANT), VARIOUS IRRITANT GASES SUCH AS NITROGEN DIOXIDE, SULFUR DIOXIDE, HYDROCHLORIC ACID, AND ALDEHYDES SUCH AS FORMALDEHYDE AND ACROLEIN, AND CHEMICALS KNOWN OR SUSPECTED TO BE CARCINOGENS, SUCH AS POLYCYCLIC AROMATIC HYDROCARBONS (PAHs), OXYGENATED PAHs, AND POLYCHLORINATED DIOXINS AND FURANS.

REAL-TIME MONITORING OF AIRBORNE PARTICULATE MATTER AND PAH LEVELS IN MANY RESIDENTIAL AREAS ACROSS THE COUNTRY SHOWS THAT EXPOSURE TO THESE POLLUTANTS IN SUCH AREAS IS CONSISTENT WITH THE TEMPORAL PATTERN OF RESIDENTIAL WOOD COMBUSTION. THE SITES STUDIED ARE REMOTE FROM INDUSTRIAL SOURCES AND THE TIMES OF MAXIMUM POLLUTANT LEVELS DO NOT CORRELATE WITH LOCAL TRAFFIC ACTIVITY.

OUTDOOR PAH LEVELS IN SUCH RESIDENTIAL AREAS HAVE REACHED 2 MICROGRAMS PER CUBIC METER DURING HOLIDAY EVENINGS -- COMPARABLE TO THE MAXIMUM RECORDED PAH CONCENTRATIONS IN SECONDHAND TOBACCO SMOKE. ACCORDING TO THE U. S. EPA, 29 PERCENT OF ALL PAHs EMITTED IN THE U. S. ORIGINATE FROM RESIDENTIAL WOOD COMBUSTION, AND CONVENTIONAL WOODSTOVES CAN EMIT UP TO 20 TIMES AS MUCH PAHs AS EMITTED BY FIREPLACES, PER POUND OF WOOD BURNED.

THERE ARE NUMEROUS AREAS IN WHICH OUTDOOR PM10 LEVELS, DUE PRIMARILY TO WOODSMOKE EMISSIONS, HAVE EXCEEDED THE FEDERAL 24-HOUR STANDARD OF 150 MICROGRAMS PER CUBIC METER, WELL ABOVE THE THRESHOLD FOR OBSERVED HEALTH EFFECTS.

STUDIES HAVE ALSO SHOWN THAT PEOPLE USING WOOD BURNING DEVICES TO HEAT THEIR HOMES CAN BE ROUTINELY EXPOSED TO EXCESSIVE LEVELS OF FINE PARTICULATE MATTER THAT ARE RELEASED FROM THESE DEVICES INTO THEIR INDOOR AIR. IN CASES WHERE SUCH OPERATION IS CONTINUOUS, THE FEDERAL PM2.5 24-HOUR STANDARD OF 65 MICROGRAMS PER CUBIC METER COULD UNDER CERTAIN CIRCUMSTANCES BE EXCEEDED.

MOREOVER, MONITORING OF THESE SAME POLLUTANTS IN INDOOR ENVIRONMENTS OF NEARBY (NONSMOKING, NON-WOODBURNING) HOMES HAS SHOWN LOWER YET STILL SIGNIFICANT CONCENTRATIONS (MORE THAN HALF OF

OUTDOOR LEVELS), LAGGING IN TIME BEHIND OUTDOOR PEAKS. THUS, THOSE WHO USE A WOODSTOVE TO HEAT THEIR HOME ARE LIKELY EXPOSING THEIR COMMUNITIES, AND ESPECIALLY THEIR OWN FAMILIES, TO GREATER HEALTH RISKS.

FINDINGS FROM ANIMAL TOXICOLOGICAL STUDIES DEMONSTRATE A REDUCTION IN PULMONARY ANTI-BACTERIAL DEFENSE MECHANISMS ASSOCIATED WITH WOODSMOKE EXPOSURE. WOODSMOKE EXPOSURE CAN DISRUPT CELLULAR MEMBRANES, DEPRESS MACROPHAGE ACTIVITY, DESTROY CILIATED AND SECRETORY EPITHELIAL CELLS AND CAUSE ABERRATIONS IN BIOCHEMICAL ENZYME LEVELS.

EPIDEMIOLOGICAL STUDIES SHOW A COHERENCE OF DATA AMONG STUDIES OF HEALTH CONSEQUENCES FOR THOSE EXPOSED TO WOODSMOKE. PERSONS AT HIGHER RISK INCLUDE YOUNG CHILDREN, THE ELDERLY, AND PEOPLE WITH PREEXISTING CARDIOPULMONARY DISEASE. DEMONSTRATED EFFECTS INCLUDE INCREASED PULMONARY SYMPTOMS, INCREASED HOSPITAL ADMISSIONS FOR LOWER RESPIRATORY INFECTIONS, EXACERBATION OF ASTHMA, AND DECREASED PULMONARY FUNCTION IN SCHOOL-AGE CHILDREN. AS A MAJOR CONTRIBUTOR TO ATMOSPHERIC PM LOADING, WOODSMOKE CAN ALSO BE INDIRECTLY LINKED WITH A VARIETY OF OTHER PM-ASSOCIATED OUTCOMES, INCLUDING INCREASED RISKS OF SCHOOL ABSENTEEISM, EMERGENCY ROOM VISITS AND HOSPITALIZATIONS FOR CARDIOPULMONARY CONDITIONS, AND MORTALITY.

EXPERIENCE SHOWS THAT METEOROLOGIC AND TOPOGRAPHIC FACTORS AND BACKGROUND AMBIENT AIR QUALITY MAY AFFECT THE SERIOUSNESS OF THE IMPACT OF WOODBURNING IN A COMMUNITY ON PUBLIC HEALTH. WHAT MAY BE CONSIDERED ACCEPTABLE PREVALENCE AND PROXIMITY OF RESIDENTIAL WOOD COMBUSTION IN ONE AREA MAY NOT NECESSARILY BE SO IN ANOTHER.

FINAL NOTE 1:

PRACTICES SUCH AS OPEN BURNING OF HOUSEHOLD REFUSE AND YARD WASTES ALSO PRODUCE GROSS EMISSIONS OF PRODUCTS OF INCOMPLETE COMBUSTION. EXPOSURE TO THESE EMISSIONS HAS BEEN LINKED WITH ACUTE SYMPTOMS AND ADVERSE HEALTH EFFECTS. WHILE ADDITIONAL STUDY TO CHARACTERIZE THESE EMISSIONS AND EFFECTS IS CLEARLY NEEDED, THE AMERICAN LUNG ASSOCIATION EXPRESSES A PREFERENCE FOR CONSERVATIVE PUBLIC HEALTH POLICIES THAT DISCOURAGE SUCH OPEN BURNING, ESPECIALLY WHERE

THE POTENTIAL FOR SIGNIFICANT EXPOSURE OF VULNERABLE POPULATIONS TO THE RESULTING EMISSIONS EXISTS.

FINAL NOTE 2:

FOR CONSUMERS WHO ARE CONSIDERING REPLACING THEIR WOOD BURNING APPLIANCES WITH GAS BURNING APPLIANCES, THE AMERICAN LUNG ASSOCIATION RECOMMENDS CHOOSING VENTED APPLIANCES WHENEVER POSSIBLE, TO MINIMIZE POTENTIAL INDOOR AIR QUALITY CONCERNS.

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